

**Travis Air Force Base  
Environmental Restoration Program  
Remedial Program Manager's  
Meeting Minutes**

**18 July 2012, 0930 Hours**

Mr. Mark Smith, Travis Air Force Base (AFB), conducted the Remedial Program Manager's (RPM) meeting on 18 July 2012 at 0930 hours, at Travis AFB, California. Attendees included:

- Mark Smith Travis AFB
- Glenn Anderson Travis AFB
- Lonnie Duke Travis AFB
- Merrie Schilter-Lowe Travis AFB
- Gregory Parrott Travis AFB
- Alan Friedman California Regional Water Quality Control Board (RWQCB)
- Jose Salcedo California Department of Toxic Substances Control (DTSC)
- Nadia Hollan Burke United States Environmental Protection Agency (USEPA)
- Mary Snow Techlaw, Inc
- Rachel Hess ITSI
- Mehrdad Javaherian JC Palomar
- Mike Wray CH2M HILL
- Loren Krook CH2M HILL
- Tricia Carter CH2M HILL
- Tony Chakurian CH2M HILL

Handouts distributed at the meeting and presentations included:

- Attachment 1 Meeting Agenda
- Attachment 2 Master Meeting and Document Schedule
- Attachment 3 SBBGWTP Monthly Data Sheet (June 2012)
- Attachment 4 CGWTP Monthly Data Sheet (June 2012)
- Attachment 5 NGWTP Monthly Data Sheet (June 2012)
- Attachment 6 ST018GWTP Monthly Data Sheet (June 2012)
- Attachment 7 Presentation: Lysimeter Removal
- Attachment 8 Presentation: Enzyme Assessment Results

- Attachment 9                      Presentation: 5-Year Review
- Attachment 10                    Presentation: Program Update: Activities Completed, In Progress and Upcoming

## 1. **ADMINISTRATIVE**

### **A. Previous Meeting Minutes**

The 13 June 2012 RPM meeting minutes were approved and finalized as written.

### **B. Action Item Review.**

Action items from June were reviewed.

Action item one still open: Travis AFB to research beneficial reuse of treated water. Mr. Smith will contact the Project Manager at AFCEE to discuss, and give an update at next RPM meeting. Mr. Smith talked with AFCEE regarding beneficial reuse, AFCEE is looking into it. Update: AFCEE is in agreement with treated water reuse using Defense Environmental Restoration Account (DERA) funds under the authority of a “net-zero policy” for the Air Force. More information to follow.

Action item two still open: EPA and DTSC to email Travis AFB the person’s name and title who will be signing the ROD.

Action item three still open: Give a Groundwater ROD presentation to EPA. Date was changed to TBD.

## **Master Meeting and Document Schedule Review (see Attachment 2)**

The Travis AFB Master Meeting and Document Schedule (MMDS) was discussed during this meeting (see Attachment 2).

### **Travis AFB Annual Meeting and Teleconference Schedule**

— The next RPM meeting will be held on 15 August 2012 at 0930 hours.

### **Travis AFB Master Document Schedule**

— Proposed Plan (PP): The Response to Comments Meeting date changed to 18 July 2012, due to the amount of comments Travis AFB received from the agencies. The Draft Final will include the last minute changes and will be reviewed by AFCEE and The Agencies. The only change anticipated between Draft Final and The Final will be the dates for The Public Meeting, and The Public Comment Period. Ms. Burke asked if the Draft Final will be co-reviewed by AFCEE and the Agencies before going Final. Mr. Anderson said yes, Travis AFB has to receive approval on the PP from AFCEE. The rest of the dates were changed accordingly.

- Groundwater Record of Decision (ROD): Predraft to AF/Service Center was changed to 03 August 2012. The rest of the dates were changed accordingly.
- Potrero Hills Annex: (FS, PP, and ROD): No change to schedule. Mr. Anderson said that the Work Plan (WP) has been received and has a three phase approach for investigating Perchlorate in both soil and groundwater.
- Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes: No change to schedule. Travis AFB received comments from EPA. The RWQCB and DTSC had no comments.
- Work Plan for Remedial Process Optimization of Sites SS016 and SS029: The agencies comments have been resolved. The Final will go out on Friday, 20 July 2012.
- Technical and Economic Feasibility Analysis (TEFA): Moved to history.
- Site LF007C Data Gaps Investigation Technical Memorandum: No change to the schedule. Travis AFB is responding to EPA's comments. The RWQCB and DTSC both reviewed the document and had no comments.
- FT005 Remedial Action Completion Report: The Draft to Agencies date was changed to 20 July 2012. The rest of the dates were changed accordingly. A new appendix (I) was added due to the removal of Land Use Controls (LUC).
- Quarterly Newsletter (July 2012): The Final Due date was changed to TBD. The newsletter has been written to advertise the availability of the Groundwater Proposed Plan (PP), so the newsletter will be finalized and published as soon as the Proposed Plan public meeting schedule becomes firm.
- 2011 Groundwater Treatment RPO Annual Report: The Final Due date was changed to TBD. Travis AFB has received EPA comments and is working on the responses.
- 2011 CAMU Annual Report: Moved to history.
- Old Skeet Range Engineering Evaluation/Cost Analysis: No change to the schedule.

## 2. CURRENT PROJECTS

### Treatment Plant Operation and Maintenance Update

Mr. Duke reported on the treatment plant status.

#### **South Base Boundary Groundwater Treatment Plant (see Attachment 3)**

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 4.9 million gallons of groundwater were extracted and treated during the month of June 2012. All of the treated water was discharged to Union

Creek. The average flow rate for the SBBGWTP was 122 gallons per minute (gpm). Electrical power usage was 11,760 kWh and approximately 16,111 pounds of CO<sub>2</sub> were created (based on DOE calculation). Approximately 2.5 pounds of volatile organic compounds (VOCs) were removed in June. The total mass of VOCs removed since startup of the system is 424 pounds.

Optimization Activities: No optimization activities to report for the month of June.

#### **Central Groundwater Treatment Plant (see Attachment 4)**

The Central Groundwater Treatment Plant (CGWTP) performed at 69% uptime with approximately 1.1 million gallons of groundwater extracted and treated during the month of June 2012. All treated water was diverted to the storm drain. The average flow rate for the CGWTP was 40.3 gpm. Electrical power usage was 1,672 kWh for all equipment connected to the Central plant, and approximately 2,291 pounds of CO<sub>2</sub> were created. Approximately 3.3 pounds of VOCs were removed from groundwater in June. The total mass of VOCs removed since the startup of the system is 11,286 pounds.

Optimization Activities for WTTP: The WTTP remains off line since it was shut down in April 2010 for the ongoing rebound study. No additional optimization activities to report for the month of June.

Optimization Activities for CGWTP: No optimization activities to report for the month of June.

#### **North Groundwater Treatment Plant (see Attachment 5)**

The North Groundwater Treatment Plant (NGWTP) was brought on-line on 6 June 2012 for approximately seven hours before system samples were collected. All groundwater was routed through the NGWTP carbon vessels and was discharged to the effluent holding tank. The transfer pump was taken off line awaiting analytical results before being discharged to the Duck Pond.

The North Groundwater Treatment Plant (NGWTP) performed at 1% uptime with approximately 560 gallons of groundwater extracted and treated during the month of June 2012. The average flow rate of the NGWTP, while operating, was 0 gpm and electrical power use was 457 kWh for all the equipment connected to the North plant; approximately 626 pounds of CO<sub>2</sub> was created. Approximately 0 VOCs were removed from the groundwater in June. The total mass of VOCs removed since the startup of the system is 174.3.

Note: the average flow rates were not calculated since the system only ran for startup sample collection and no water was discharged to the duck pond.

#### **Site ST018 Groundwater (MTBE) Treatment Plant (see Attachment 6)**

The Site ST018 (MTBE) Treatment Plant (ST018 GWTP) performed at 91% uptime with approximately 191 thousand gallons of groundwater extracted and treated during the month of June 2012. All treated water was diverted to the storm drain. The average flow rate for the ST018 GWTP was 4.73 gpm. Electrical power usage for the month was 178 kWh for all equipment connected to the ST018 GWTP plant, which equates to the creation of approximately 244 pounds of CO<sub>2</sub>. Approximately 2.63 pounds of BTEX, MTBE and TPH were removed from groundwater in June. The total BTEX, MTBE and TPH mass removed since the startup of the system is 17.3 pounds.

Note: electrical power use is for the alarm system and a pump that pushes water through the GAC. The other pumps in the system are all solar powered.

Optimization Activities: No optimization activities to report for the month of June.

### **3. Presentations**

#### **Lysimeter Removal (see Attachment 7)**

Ms. Hess reported on the Lysimeter Removal. See attachment 7 for details. Highlights included:

##### **LF007 CAMU History:**

- The LF007 Corrective Action Management Unit (CAMU) was constructed in December 2002 on top of the former municipal landfill, and capped with an engineered evapotranspiration (ET) final cover system.
- In 2003, a lysimeter was installed, and was intended to be monitored for one year to verify that the ET cover performed as designed. After installation, monthly monitoring was conducted. The monitoring results collected since 2008 had produced increasingly contradictory data due to normal wear and tear of the equipment.
- With regulatory agency approval the lysimeter monitoring ceased in May 2010 and was scheduled for removal.

##### **LF007 Lysimeter Removal:**

- Lysimeter removal activities were conducted 18 June through 21 June 2012.
- Clean cover soil removed from the lysimeter was reused to refill the excavation void after the removal. Water trucks were used for dust control during the removal. Approximately 18 cubic yards of pre-sampled Potrero Hills Quarry borrow soil was used to supplement the reused soil during backfill and compaction activities.
- Concrete was recycled for reuse on the Travis AFB runway project and one poly tank was repurposed. Plastic liners and two poly tanks containing grout were disposed of at a local municipal landfill.

Mr. Salcedo asked if they put down hydro-seed. Ms. Hess said it will be seeded this fall and that they will also install settlement markers and settlement stakes later this year (September or October 2012).

Ms. Hess provided pictures of the lysimeter removal before, during and after removal. See attached for photos.

Ms. Hess concluded by saying that the final documentation will be in the 2012 annual CAMU report.

### **Enzyme Assessment Results from Sites FT004 and DP039 (see Attachment 8)**

Mr. Chakurian reported on the Enzyme Assessment Results from Sites FT004 and DP039. See attachment 8 for details. Highlights included:

Goal of the Enzyme Study was to determine, through analysis of enzyme cometabolism, if there is a biological component associated with observed natural attenuation of VOC plumes at Travis AFB.

#### **Sample Locations:**

- Sites FT004 and DP039 were selected for the Enzyme Cometabolism Evaluation; both sites have MNA components. The two sites are located on opposite sides of Travis AFB. The areas to be sampled have low to non-detect concentrations of DCE and vinyl chloride (daughter products).
- Site FT004 was also selected because the TCE concentrations have been decreasing when its Groundwater Extraction and Treatment (GET) system was turned off as part of a rebound study since December 2007.
- Four monitoring wells from Site FT004 were sampled for VOC, Enzyme Activity Probe (EAP) and Quantitative Polymerase Chain Reaction (qPCR) analyses. One of the wells sampled is located upgradient of the VOC plume and represents the background, which is non-detect.
- Two monitoring wells from Site DP039 were sampled for VOCs, EAPs and qPCR. A duplicate sample was collected from one of the DP039 wells for QA/QC.

Mr. Chakurian provided maps of FT004 and DP039 to show where the sites are located on Travis AFB and the location of the sampled wells (see attachment).

#### **Enzyme Activity Probe Analyses:**

- The EAP study was performed to evaluate the presence and activity of five enzymes that cometabolically degrade TCE.

- The groundwater samples were each analyzed using five EAPs. To confirm the presence of the enzymes identified during the EAP analysis, qPCR analyses were conducted for each groundwater sample. qPCR identifies the presence of the genes of the bacteria that produce the enzymes being evaluated by EAP analyses.
- TCE concentrations at the monitoring wells were similar to previous sampling events. There were low to non-detect concentrations of DCE and vinyl chloride. The background well MW264x04 is non-detect for chlorinated VOCs (see attachment for EAP and qPCR results).

#### Plume Attenuation:

- For MNA to be considered a viable remedy, it is necessary to demonstrate plume attenuation (stable or shrinking).
- A limitation of the EAP and qPCR data is that the demonstration of the activity of cometabolic enzymes cannot fully show the degree to which cometabolism contributes to the natural attenuation of a solvent plume. However, if contaminant concentrations are decreasing over time and cometabolic enzymes and microbes are present and active, then it can be inferred that microbial processes may be contributing to the reduction of contaminant mass.

The results of the investigation are indicative of enzymatic cometabolic activity at similar but geographically distant groundwater sites and provide one line of evidence supporting the occurrence of biological natural attenuation at Travis AFB. Due to the similar hydrogeologic conditions across Travis AFB, it is likely that cometabolic enzymes are widespread at the base, and that cometabolic activity may be contributing to natural attenuation not only at Sites FT004 and DP039, but also at other VOC plumes.

Ms. Burke asked if this study helps with future remedy optimization. Mr. Smith said it could, but it is too early to tell; Travis AFB wanted to demonstrate by conducting this study that the biological component of natural attenuation could be happening across the base, given the similar geographical topography on base. Mr. Anderson added it was not an exhaustive study. We know the plumes aren't moving. Travis AFB learned through the phytostabilization treatability study that volatilization of dissolved solvents is taking place. It could be that in the summer the ground develops desiccation cracks that promote the off-gassing. During the winter when the desiccation cracks are closed, a greater amount of MNA could be attributed to biological degradation.

#### **Five-Year Review and Site List (see Attachment 9)**

Mr. Javaherian reported on the Third Five-Year Review. See Attached 9 for details. Highlights included:

Mr. Javaherian said the process looks at the cleanup activities that have taken place in the last five years. The draft five-year review lists site name, site description, and status of environmental response activities, similar to what was included in the second five-year review. There will also be a section in the five-year review report that will include sites that were closed prior to the second five year review; this informal review will be included to confirm that the

cleanup goals have not changed. Included in Attachment 9 is the third five-year review schedule. Mr. Smith commented on the five year review schedule, stating that Mr. Chang, the previous EPA project manager, suggested Travis AFB include all sites with recent decision documents in the 2013 5-Year review rather than in 2017 as had been proposed by Travis. This allowed for more sites to be on the same 5-Year review schedule earlier. Mr. Smith handed out an all inclusive “site list” (not including the MMRP site) (see Attachment 9).

#### **Program Update: Activities Completed, In Progress and Upcoming (see Attachment 10)**

Mr. Wray reported on the status of field work and documents which are completed, in progress, and upcoming. See Attachment 7 for details. Highlights included:

Completed Field Work: CAMU Lysimeter Removal

In-Progress Documents and Field Work: Site LF007C Data Gaps Investigation Technical Memo.

Field Work In Progress: SS029/SS016 System Optimization Analysis

Upcoming Documents include FT005 Remedial Action Completion Report, and Basewide Groundwater Record of Decision (ROD).

Upcoming Fieldwork includes LF007C GET System Optimization.

#### **4. New Action Item Review**

None.

#### **5. PROGRAM/ISSUES/UPDATE**

Mr. Smith announced that the new PBR will be AFCEE controlled. The project will be awarded by AFCEE in April or May of FY13. A Request for Information was issued in June, and indicated there would be a site walk for interested contractors in August or September.

#### **6. Action Items**

Item #	Responsible	Action Item Description	Due Date	Status
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1.	Travis AFB	Research beneficial reuse of treated water and give update. Mr. Smith will contact the Project Manager at AFCEE to discuss this issue, and give an update at the 13 June RPM meeting. Update: Mr. Smith talked with AFCEE regarding beneficial reuse, AFCEE is looking into it.	TBD	Open
2.	EPA & DTSC	Email Travis AFB the person's name and title who will be signing the ROD.	TBD	Open
3.	Travis AFB	Give a Groundwater ROD presentation to EPA.	TBD	Open

TRAVIS AIR FORCE BASE  
ENVIRONMENTAL RESTORATION PROGRAM  
REMEDIAL PROGRAM MANAGER'S MEETING  
BLDG 570, Main Conference Room  
18 July 2012, 9:30 A.M.  
AGENDA

1. ADMINISTRATIVE

- A. PREVIOUS MEETING MINUTES
- B. ACTION ITEM REVIEW
- C. MASTER MEETING AND DOCUMENT SCHEDULE REVIEW

2. CURRENT PROJECTS

- A. TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE (LONNIE)

3. PRESENTATIONS

- A. LYSIMETER REMOVAL
- B. ENZYME ASSESSMENT RESULTS
- C. 5-YEAR REVIEW
- D. PROGRAM UPDATE: ACTIVITIES COMPLETED, IN PROGRESS AND UPCOMING

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

- A. REQUEST FOR INFORMATION – FY13 PBC PREPARATION

NOTE: WE HAVE SET ASIDE THE 1:00 PM TO 4:30 PM TIMEFRAME AFTER THE RPM MEETING TO DISCUSS ANY REGULATORY COMMENTS ON THE DRAFT GROUNDWATER PROPOSED PLAN AS WELL AS THE REMAINING COMMENT RESPONSES ON THE SS029/SS016 RPO WORK PLAN.

## Travis AFB Master Meeting and Document Schedule

(2012)

### Annual Meeting and Teleconference Schedule

Monthly RPM Meeting (Begins at 9:30 a.m.)	RPM Teleconference (Begins at 9:30 a.m.)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
01-18-12	—	—
02-22-12	—	—
03-21-12	—	—
04-19-12 (2:00 PM)	—	04-19-12
05-16-12	—	—
06-13-12	—	—
07-18-12	—	—
08-15-12	—	—
09-19-12	—	—
10-18-12 (1:00 PM)	—	10-18-12
11-14-12	—	—
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## Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS		
Life Cycle	Basewide Groundwater	
	Proposed Plan Travis, Glenn Anderson CH2M HILL, Tricia Carter	Record of Decision Travis, Glenn Anderson CH2M HILL, Leah Waller
<b>Scoping Meeting</b>	NA	<b>01-24-07 (11-30-11)</b>
Predraft to AF/Service Center	10-06-11	08-03-12
AF/Service Center Comments Due	11-05-11	10-04-12
Draft to Agencies	05-09-12	10-12-12
Draft to RAB	05-09-12	10-12-12
Agency Comments Due	06-15-12	12-12-12
<b>Response to Comments Meeting</b>	<b>07-18-12</b>	<b>01-09-13</b>
Public Comment Period	09-05-12 to 10-05-12	NA
<b>Public Meeting</b>	<b>09-19-12</b>	<b>NA</b>
Response to Comments Due	07-27-12	01-16-13
Draft Final Due	07-27-12	01-16-13
Final Due	08-27-12	02-18-13

## Travis AFB Master Meeting and Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Potrero Hills Annex Travis, Glenn Anderson		
	FS	Proposed Plan	ROD
<b>Scoping Meeting</b>	<b>180 days after Water Board Order Rescinded</b>	<b>+470 days</b>	<b>+735 days</b>
Predraft to AF/Service Center	+ 270 days	+530 days	+ 915 days
AF/Service Center Comments Due	+ 300 days	+560 days	+ 975 days
Draft to Agencies	+330 days	+590 days	+ 1035 days
Draft to RAB	+ 330 days	+590 days	+ 1035 days
Agency Comments Due	+390 days	+650 days	+ 1095 days
<b>Response to Comments Meeting</b>	<b>+ 405 days</b>	<b>+665 days</b>	<b>+ 1110 days</b>
Agency Concurrence with Remedy	NA	NA	+ 1130 days
Public Comment Period	NA	+735 to 765 days	NA
<b>Public Meeting</b>	<b>NA</b>	<b>+745 days</b>	<b>NA</b>
Response to Comments Due	+430 days	+695days	+ 1190 days
Draft Final Due	+430 days	+695 days	+ 1190 days
Final Due	+460 days	+725 days	+ 1250 days

## Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS		
Life Cycle	Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes at Travis AFB Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer	Work Plan for Remedial Process Optimization of Sites SS016 and SS029 at Travis AFB Travis AFB, Lonnie Duke Tri-Hydro, Glenn Leong
<b>Scoping Meeting</b>	NA	NA
Predraft to AF/Service Center	05-18-12	01-06-12
AF/Service Center Comments Due	06-01-12	01-20-12
Draft to Agencies	06-15-12	02-22-12
Draft to RAB	06-15-12	02-22-12
Agency Comments Due	07-16-12	04-02-12
<b>Response to Comments Meeting</b>	<b>07-18-12</b>	<b>07-18-12</b>
Response to Comments Due	08-06-12	<b>07-20-12</b>
Draft Final Due	NA	NA
Final Due	08-06-12	<b>07-20-12</b>
Public Comment Period	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>

## Travis AFB Master Meeting and Document Schedule

SECONDARY DOCUMENTS		
Life Cycle	Site LF007C Data Gaps Investigation Technical Memorandum  Travis AFB, Lonnie Duke CH2M HILL, Tony Chakurian	FT005 Remedial Action Completion Report  Travis AFB, Lonnie Duke ITSI, Rachel Hess
<b>Scoping Meeting</b>	NA	NA
Predraft to AF/Service Center	05-03-12	06-04-12
AF/Service Center Comments Due	05-17-12	06-22-12
Draft to Agencies	05-31-12	07-20-12
Draft to RAB	05-31-12	07-20-12
Agency Comments Due	07-02-12	08-24-12
<b>Response to Comments Meeting</b>	<b>07-18-12</b>	<b>09-19-12</b>
Response to Comments Due	08-01-12	09-28-12
Draft Final Due	NA	NA
Final Due	08-01-12	09-28-12
Public Comment Period	NA	NA
<b>Public Meeting</b>	NA	NA

## Travis AFB Master Meeting and Document Schedule

INFORMATIONAL DOCUMENTS			
Life Cycle	Quarterly Newsletters (July 2012) Travis, Glenn Anderson	2011 Groundwater Treatment RPO Annual Report Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick	Old Skeet Range Engineering Evaluation/Cost Analysis Travis AFB, Glenn Anderson Baywest, Steve Thornton
<b>Scoping Meeting</b>	NA	NA	NA
Predraft to AF/Service Center	NA	02-22-12	07-18-11
AF/Service Center Comments Due	NA	03-05-12	08-03-11
Draft to Agencies	07-03-12	04-19-12	09-29-11
Draft to RAB	NA	04-19-12	09-29-11
Agency Comments Due	07-17-12	05-21-12	10-31-11
<b>Response to Comments Meeting</b>	<b>TBD</b>	<b>06-13-12</b>	<b>TBD (Teleconference)</b>
Response to Comments Due	07-24-12	06-27-12	NA
Draft Final Due	NA	NA	TBD
Final Due	<b>TBD</b>	<b>TBD</b>	<b>NA</b>
Public Comment Period	NA	NA	TBD
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>	<b>TBD</b>
			<b>TBD</b>



## Travis AFB Master Meeting and Document Schedule

<b>HISTORICAL</b>		
<b>Life Cycle</b>	<b>Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes at Travis AFB Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer</b>	<b>2011 CAMU Annual Report Travis AFB, Lonnie Duke ITSI, Rachel Hess</b>
<b>Scoping Meeting</b>	<b>NA</b>	<b>NA</b>
Predraft to AF/Service Center	08-09-11	04-06-12
AF/Service Center Comments Due	08-19-11	04-12-12
Draft to Agencies	09-29-11	04-13-12
Draft to RAB	09-29-11	04-13-12
Agency Comments Due	11-14-11	05-14-12
<b>Response to Comments Meeting</b>	<b>11-30-11</b>	<b>05-16-12</b>
Response to Comments Due	11-17-11	05-18-12
Draft Final Due	NA	NA
Final Due	02-24-12	05-18-12
Public Comment Period	NA	NA
<b>Public Meeting</b>	<b>NA</b>	<b>NA</b>

# South Base Boundary Groundwater Treatment Plant

## Monthly Data Sheet

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Report Number: 142

Reporting Period: 31 May 2012 – 30 June 2012

Date Submitted: 12 July 2012

This monthly data sheet presents information regarding the South Base Boundary Groundwater Treatment Plant (SBBGWTP) and associated remedial process optimization (RPO) activities.

## System Metrics

Table 1 presents operation data from the June 2012 reporting period.

**Table 1 – Operations Summary – June 2012**

Operating Time:	Percent Uptime:	Electrical Power Usage:
<b>SBBGWTP:</b> 674 hours	<b>SBBGWTP:</b> 100 %	<b>SBBGWTP:</b> 11,760 kWh (16,111 lbs CO <sub>2</sub> generated <sup>a</sup> )
Gallons Treated: <b>4.9 million gallons</b>	Gallons Treated Since July 1998: <b>793 million gallons</b>	
Volume Discharged to Union Creek: <b>4.9 million gallons</b>		
VOC Mass Removed: <b>2.5 lbs<sup>b</sup></b>	VOC Mass Removed Since July 1998: <b>424 lbs</b>	
Rolling 12-Month Cost per Pound of Mass Removed: \$6,619 <sup>c</sup>		
Monthly Cost per Pound of Mass Removed: \$2,576		

lbs = pounds

<sup>a</sup> Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.

<sup>b</sup> Calculated using June 2012 EPA Method SW8260B analytical results.

<sup>c</sup> Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.

Table 2 presents individual extraction well flow rates along with the average system flow during the monthly reporting period.

Table 2 – SBBGWTP Average Flow Rate (gpm) <sup>a</sup>							
FT005 <sup>b</sup>				SS029		SS030	
EW01x05	8.8	EW736x05	Offline	EW01x29	7.3	EW01x30	10.1
EW02x05	1.6	EW737x05	Offline	EW02x29	5.1	EW02x30	1.3
EW03x05	Offline	EW742x05	Offline	EW03x29	2.6	EW03x30	1.1
EW731x05	Offline	EW743x05	Offline	EW04x29	11.2	EW04x30	21.8
EW732x05	Offline	EW744x05	Offline	EW05x29	8.7	EW05x30	11.5
EW733x05	Offline	EW745x05	Offline	EW06x29	20.3	EW06x30	Dry
EW734x05	11.0	EW746x05	Offline	EW07x29	2.8	EW711x30	16.4
EW735x05	5.9						
FT005 Total: 27.3				SS029 Total: 58.0		SS030 Total: 62.2	
SBBGWTP Average Monthly Flow <sup>c</sup> : 122 gpm							
<sup>a</sup> Extraction well flow rates are based on end-of-month readings.							
<sup>b</sup> Most extraction wells at FT005 were taken offline in accordance with the 2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.							
<sup>c</sup> The average groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the operating time of the plant. Flow rates listed for each well are instantaneous flow rates and may differ from the average monthly flow due to well recharge.							
gpm – gallons per minute							
Recharge –not pumping while the well recharges.							
SBBGWTP – South Base Boundary Groundwater Treatment Plant							

Table 3 presents a summary of system shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns					
Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
	None		NA		NA
SBBGWTP = South Base Boundary Groundwater Treatment Plant					

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## Summary of O&M Activities

Monthly groundwater samples at the SBBGWTP were collected on 7 June 2012. Sample results are presented in Table 4. The total VOC concentration (60.9 µg/L) in the influent sample has increased since the May 2012 sample (56.3 µg /L) was collected. Figure 1 presents a plot of influent concentrations at the SBBGWTP over the past twelve (12) months.

TCE and cis-1,2-DCE were detected at concentrations of 57.6 and 3.3 µg/L at the influent sample location in June 2012. TCE and cis 1,2-DCE were also detected in samples collected at the GAC midpoint at concentrations of 1.3 and 2.8 µg/L. No contaminants were detected in the effluent process stream. Travis AFB will continue to monitor for evidence of breakthrough of the primary carbon vessel.

## Optimization Activities

No optimization activities were performed in June 2012.

## Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as bioreactors and EVO injection well networks.

Figure 2 presents the historical GHG production from the SBBGWTP. The SBBGWTP produced approximately 16,111 pounds of GHG during June 2012. GHG production has decreased (from 19,975 pounds) since May 2012 as a result of decreased SBBGWTP operating time. The overall energy consumption levels remain consistent with the general decrease in energy demand since the air stripper was bypassed, and the GAC system was brought online.

TABLE 4

Summary of Groundwater Analytical Data for June 2012 – South Base Boundary Groundwater Treatment Plant

				7 June 2012 (µg/L)		
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	Influent	Midpoint	Effluent
Halogenated Volatile Organics						
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.50	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	3.3	2.8	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	57.6	1.3	ND
Vinyl Chloride	0.5	0.18	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.17	0	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	ND
Total Suspended Solids (mg/L)	NE	1.0	0	23	NM	NM

\* In accordance with Appendix B of the Travis AFB South Base Boundary Groundwater Treatment Plant Operations and Maintenance Manual (CH2M HILL, 2004).

## Notes:

J = analyte concentration is considered an estimated value

mg/L = milligrams per liter

N/C = number of samples out of compliance with discharge limits

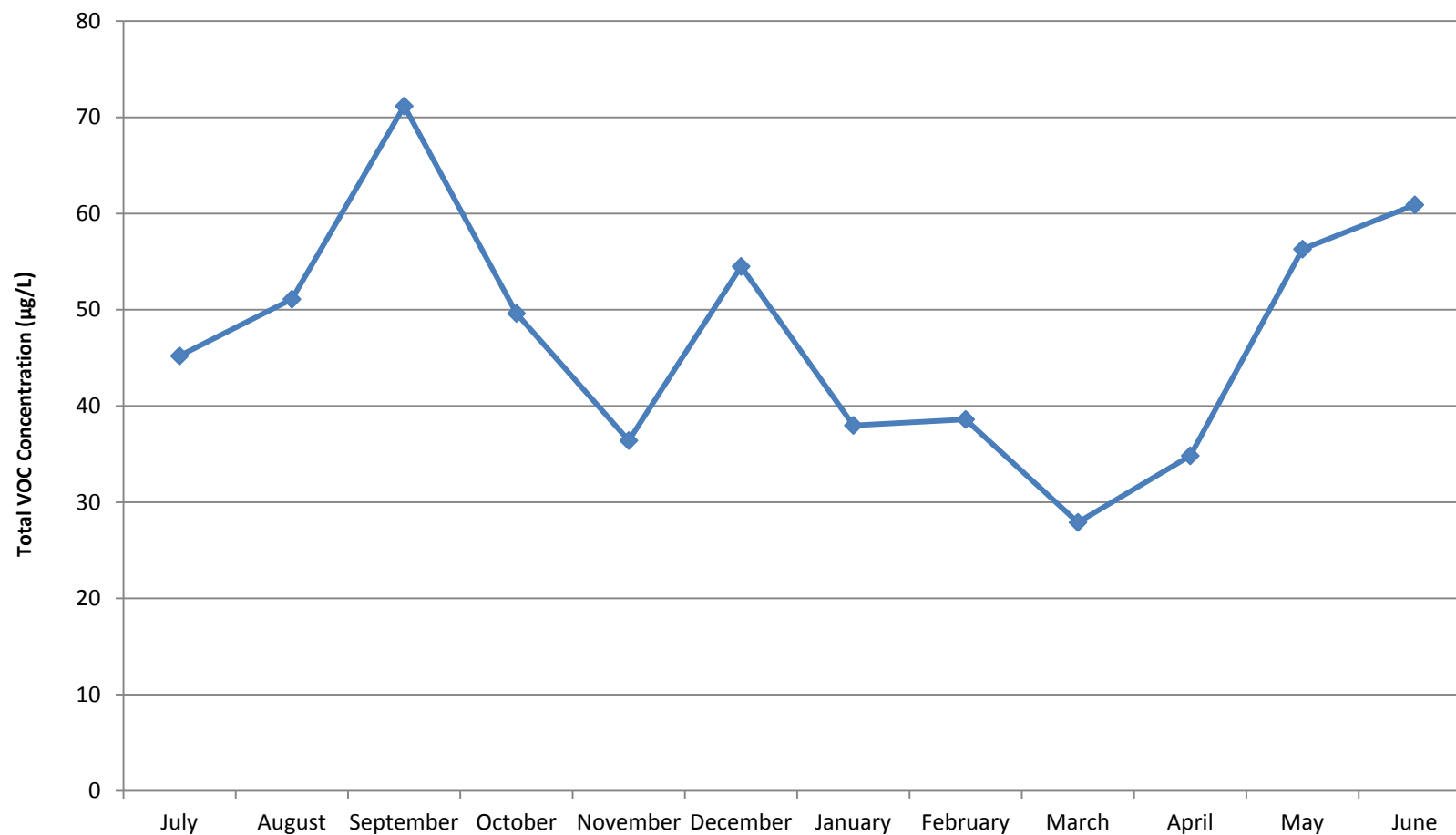
ND = not detected

NE = not established

NM = not measured

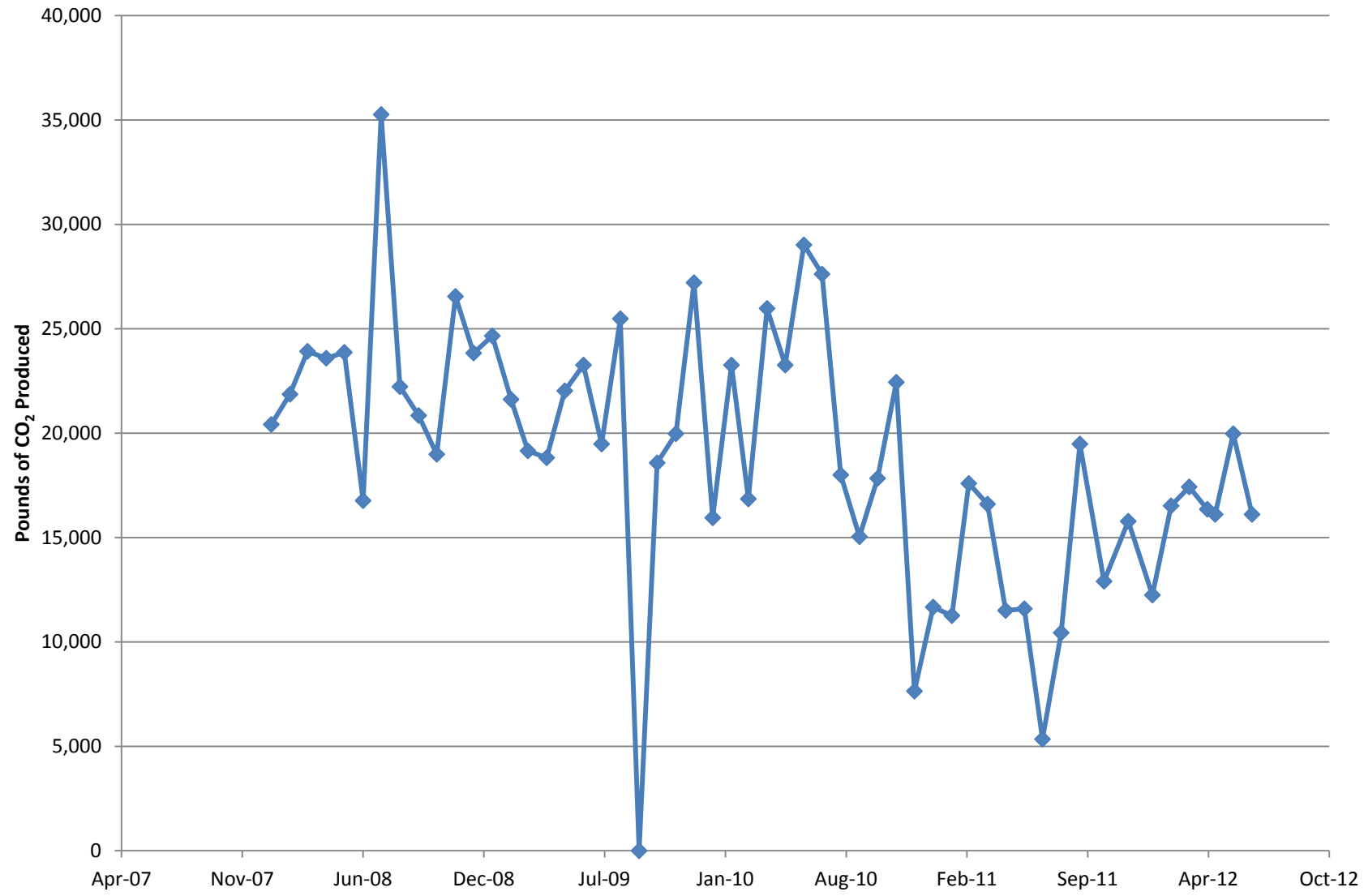
µg/L = micrograms per liter

**Figure 1**  
**SBBGWTP Total VOC Influent Concentrations - Twelve Month History**  
**Travis Air Force Base, California**



**Figure 2**

**Equivalent Pounds of CO<sub>2</sub> Produced by the South Base Boundary Groundwater Treatment Plant**



# Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 155

Reporting Period: 31 May 2012 – 30 June 2012

Date Submitted: 12 July 2012

This monthly data sheet presents information regarding the Central Groundwater Treatment Plant (CGWTP) and its associated technology demonstrations. The ongoing technology demonstrations related to the CGWTP include various emulsified vegetable oil (EVO) injections, two (2) bioreactor treatability studies, and various rebound studies.

## System Metrics

Table 1 presents operational data from the June 2012 reporting period.

Table 1 – Operations Summary – June 2012					
Operating Time:		Percent Uptime:		Electrical Power Usage:	
<b>CGWTP:</b>	463 hours	<b>CGWTP:</b>	69%	<b>CGWTP:</b>	1,672 kWh (2,291 lbs CO <sub>2</sub> generated <sup>a</sup> )
<b>WTTP:</b>	Water: 0 hours Vapor: 0 hours	<b>WTTP<sup>b</sup>:</b>	Water: 0% Vapor: 0%	<b>WTTP:</b>	0 kWh
Gallons Treated: <b>1.1 million gallons</b>		Gallons Treated Since January 1996: <b>464 million gallons</b>			
VOC Mass Removed:		VOC Mass Removed Since January 1996:			
<b>3.3 lbs<sup>b</sup> (groundwater only)</b>		<b>2,600 lbs from groundwater</b>			
<b>0 lbs (vapor only)</b>		<b>8,686 lbs from vapor</b>			
Rolling 12-Month Cost per Pound of Mass Removed: \$1,451 <sup>c</sup>					
Monthly Cost per Pound of Mass Removed: \$2,730					
<sup>a</sup> Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.					
<sup>b</sup> Calculated using June 2012 EPA Method SW8260B analytical results.					
<sup>c</sup> Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the CGWTP.					



Table 2 presents individual extraction well flow rates during the monthly reporting period. All WIOU extraction wells continue to remain off line for the WIOU rebound study.

Table 2 – CGWTP Average Flow Rates <sup>a</sup>		
Location	Average Flow Rate	
	Groundwater (gpm)	Soil Vapor (scfm) <sup>b</sup>
EW01x16	21.4	Offline
EW02x16	7.3	Offline
EW03x16	0.4 <sup>c</sup>	Offline
EW605x16	6.9 <sup>d</sup>	Offline
EW610x16	4.3	Offline
CGWTP	40.3	--
WTPP	Offline <sup>b</sup>	Offline
<sup>a</sup> Flow rates calculated by dividing total gallons processed by system operating time for the month. <sup>b</sup> No vapor or groundwater was treated in June 2012. <sup>c</sup> Water discharged to Site SS016 bioreactor – flow rate taken from wellhead Flow Totalizer divided by operating time during the month. <sup>d</sup> Extraction well flow rate based on end-of-month reading. Wellhead Flow Totalizer inoperable during June 2012. gpm = gallons per minute -- = not applicable/not available scfm = standard cubic feet per minute		

Table 3 presents average a summary of shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns					
Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
CGWTP (Groundwater)					
	6/4/2012	15:30	6/12/2012	11:15	The CGWTP was shut down due to May 2012 analytical data from the effluent sampling location, which showed contaminant concentrations exceeding discharge limits for analytes not present at the influent sampling location. No contaminants were detected in confirmation samples collected from the effluent sampling location on 4 June 2012.
	6/17/2012	19:30	6/18/2012	13:30	High temperatures caused the level sensor on the top of tank to overheat and malfunction.
WTPP					
	System down for rebound study		NA		NA
CGWTP = Central Groundwater Treatment Plant WTPP = West Transfer Treatment Plant					

## Summary of O&M Activities

The 15 May 2012 effluent sample contained detectable concentrations of several contaminants that are not typically seen in samples collected from the CGWTP. 1,1,2-trichloroethane, bromomethane, and 4-methyl-2-pentanone were detected at the highest concentrations (5, 3, and 7 µg/L, respectively), with estimated (J flag) concentrations of 1,3-dichlorobenzene, 2-hexanone, bromobenzene, bromoform, and trans-1,3-dichloropropene also being detected. None of the eight (8) contaminants detected in the effluent sample were detected in the influent sample.

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As outlined in the CGWTP O&M manual, confirmation samples were collected immediately (within 24 hours) from the system effluent and post-GAC sample locations. These confirmation samples were collected on 4 June 2012, the same day that the validated analytical data from May 2012 were received. The results of the confirmation samples were analyzed on a quick turnaround time (24-hour) and the CGWTP was taken off line until the validated analytical data was available. No analytes were detected in any of the confirmation samples, which were collected from the system effluent and after-carbon-treatment sampling locations. Based on the confirmation sample results, the CGWTP was restarted on 12 June 2012.

Monthly treatment system samples at the CGWTP were collected on 12 June 2012. Sample results are presented in Table 4. The total VOC concentration (357 µg/L) in the influent sample has increased slightly since the May 2012 sample (330 µg/L) was collected. Concentrations of 1,3-Dichlorobenzene (0.2 J µg/L), cis-1,2-DCE (44.7 µg/L), trans-1,2-Dichloroethene (3.1 µg/L), Tetrachloroethene (0.54 µg/L), and TCE (298 µg/L) were detected at the influent sampling location. None of these contaminants were detected in the system effluent.

Vinyl chloride was detected at the influent sampling location, but was not detected at the system effluent sampling location. The vinyl chloride concentration increased slightly through the primary GAC vessel from 0.32 J µg/L to 0.56 µg/L and was measured at 0.26 J µg/L at the sampling location following the secondary GAC vessel. Vinyl chloride was not detected at the effluent sample location. Travis Air Force Base will continue to monitor vinyl chloride and other contaminant concentrations at CGWTP for breakthrough in the primary vessel, as this is the fifth consecutive month that the primary vessel has not significantly reduced the influent vinyl chloride concentration.

Figure 1 presents a plot of influent concentrations (total VOCs) at the CGWTP versus time for the past twelve (12) months.

The Site DP039 bioreactor has transitioned to a “pulsed mode” operation in order to improve the rate of remediation and to preserve the small amounts of total organic carbon being produced within the bioreactor. The bioreactor was off line for four (4) weeks from 11 May 2012 through 11 June 2012. It operated for two (2) weeks from 11 June 2012 through 25 June 2012 when EW782x39 (the Site DP039 bioreactor recirculation well) was again taken off line. EW782x39 is scheduled to be restarted for two (2) weeks on 20 July 2012.

## Optimization Activities

No optimization activities occurred at CGWTP in June 2012.

## Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as bioreactors and EVO injection well networks.

Figure 2 presents the historical GHG production from the systems associated with the CGWTP. The CGWTP produced approximately 2,291 pounds of GHG during June 2012. This is a decrease from the amount produced in May 2012 (approximately 3,940 pounds) and can be attributed to decreased operation time.

TABLE 4

Summary of Groundwater Analytical Data for June 2012 – Central Groundwater Treatment Plant

				12 June 2012 (µg/L)			
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
1,2-Dibromoethane	5.0	0.11	0	ND	ND	ND	ND
2-Hexanone	5.0	0.48	0	ND	ND	ND	ND
4-Methyl-2-Pentanone	5.0	1.0	0	ND	ND	ND	ND
Bromoform	5.0	0.19	0	ND	ND	ND	ND
MTBE	1.0	0.5	0	ND	ND	ND	ND
Bromobenzene	5.0	0.21	0	ND	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	0.2 J	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	ND
Chloroethane	5.0	0.72	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	44.7	1.9	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	3.1	ND	ND	ND
Bromomethane	5.0	0.43	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.54	ND	ND	ND
trans-1,3-Dichloropropene	5.0	0.3	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND	ND
Trichloroethene	5.0	0.19	0	298	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	0.32 J	0.56	0.26 J	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND	ND
Total Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND	ND
Other							
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	896	NM

\* In accordance with Appendix G of the *Travis AFB Central Groundwater Treatment Plant Operations and Maintenance Manual* (URS Group, Inc., 2002).

Notes:

J = analyte concentration is considered an estimated value

N/C = number of samples out of compliance with discharge limits

ND = not detected

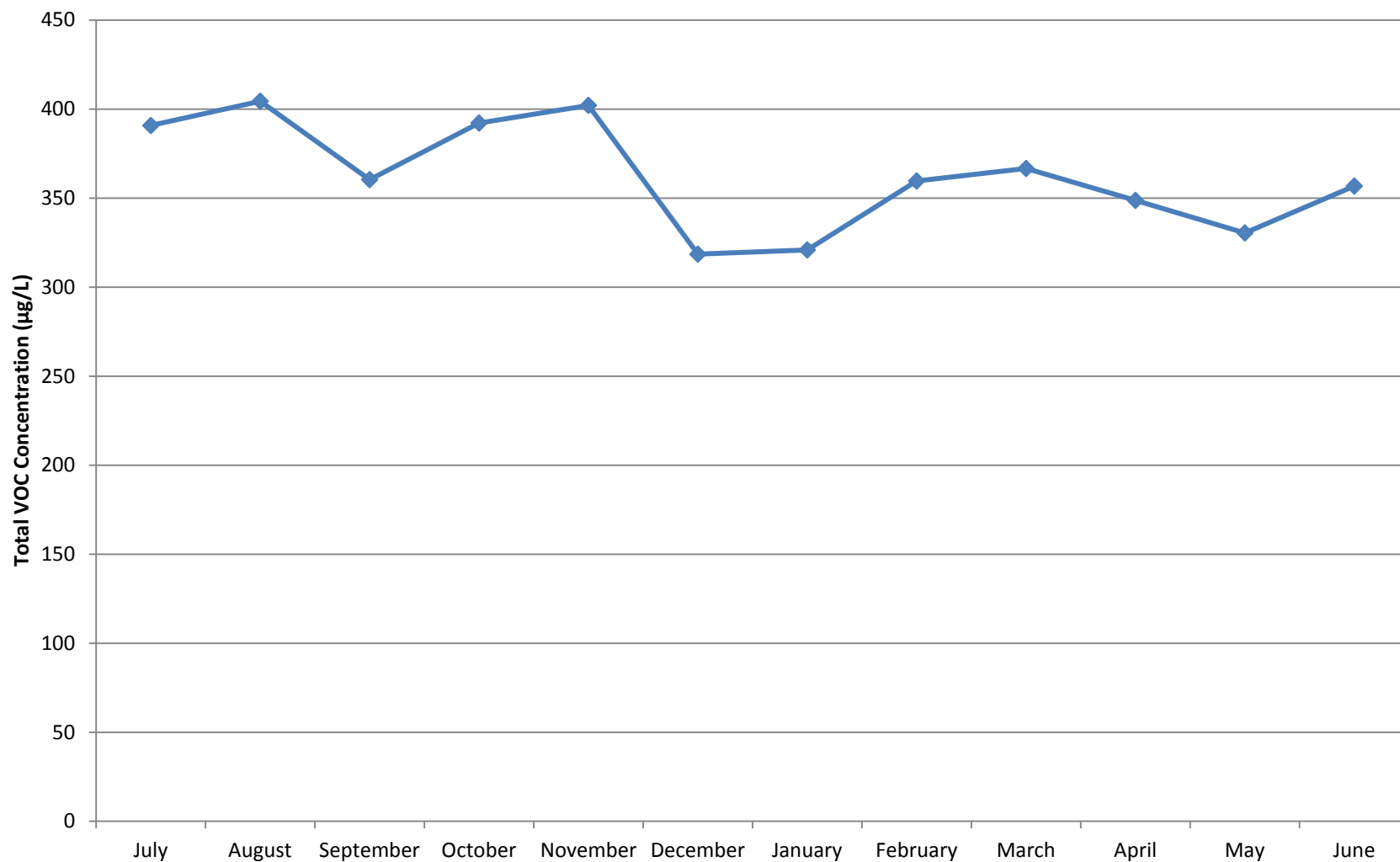
µg/L = micrograms per liter

mg/L = milligrams per liter

Table 5 presents the Site DP039 bioreactor recirculation well pulsing dates.

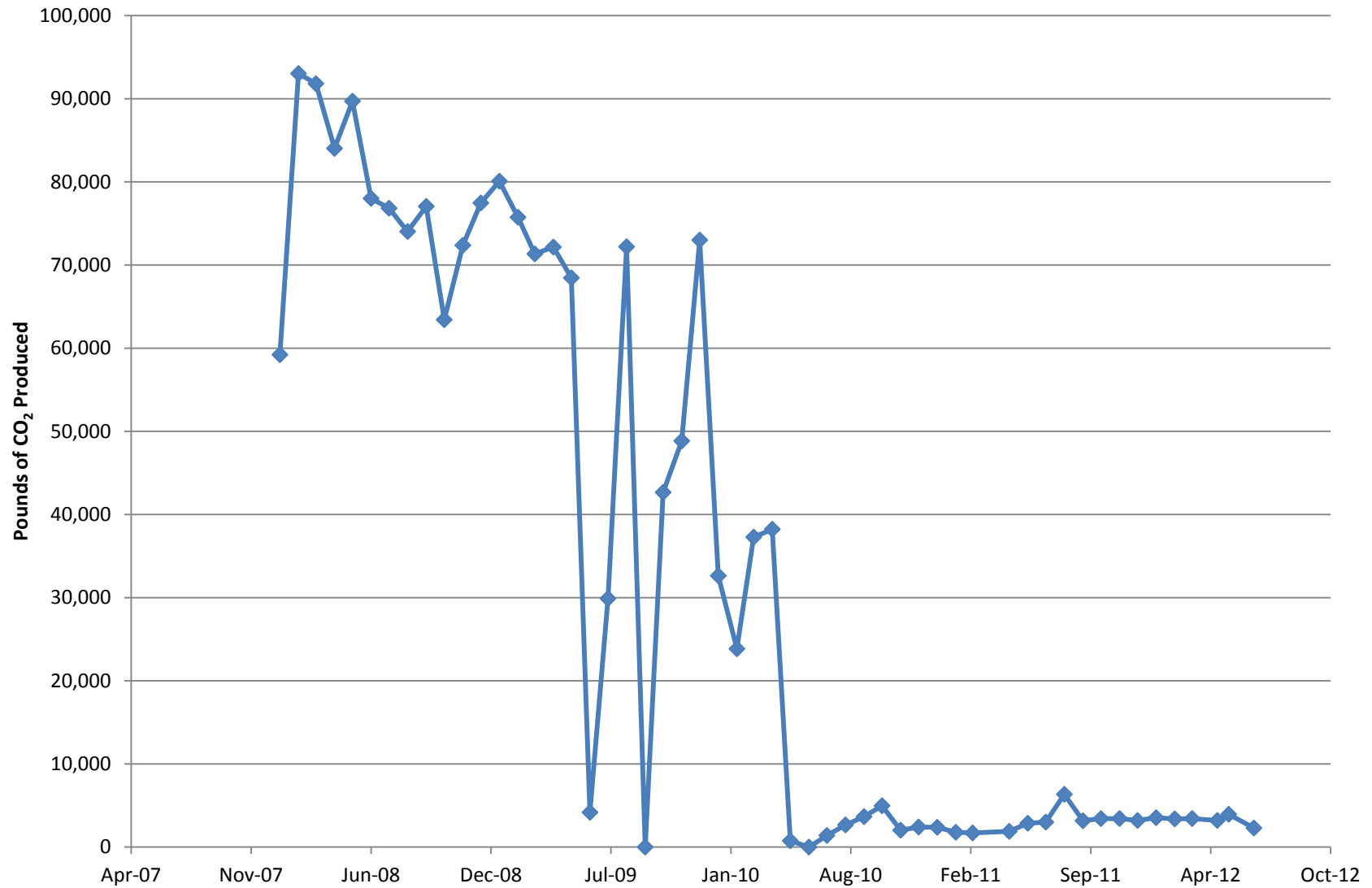
Table 5 – Summary of DP039 Bioreactor “Pulsed Mode” Operations		
Location	Pulse On Start Date	Pulse Off Start Date
EW782x39	20 December 2011	30 December 2011
	30 January 2012	20 February 2012
	20 March 2012	13 April 2012
	27 April 2012	11 May 2012
	11 June 2012	25 June 2012
CGWTP = Central Groundwater Treatment Plant EW = Extraction Well		

**Figure 1**  
**CGWTP Total VOC Influent Concentrations - Twelve Month History**  
**Travis Air Force Base, California**



**Figure 2**

**Equivalent Pounds of CO<sub>2</sub> Produced by the Central Groundwater Treatment Plant**



# North Groundwater Treatment Plant Monthly Data Sheet

Report Number: 125

Reporting Period: 31 May 2012 – 30 June 2012

Date Submitted: 12 July 2012

This monthly data sheet presents information regarding the North Groundwater Treatment Plant (NGWTP) and associated remedial process optimization (RPO) activities. The NGWTP has been offline since 21 March 2012 when ponded water was observed in seasonal vernal pools at Site LF007C. As required by US Fish and Wildlife Service (USFWS), extraction wells EW614x07 and EW615x07 must not operate when vernal pools have formed at Site LF007C. Since the vernal pools had dissipated, startup sampling was performed on 6 June 2012, and the NGWTP is expected to be brought back on line in July 2012.

## System Metrics

Table 1 presents operational data from the June 2012 reporting period:

Table 1 – Operations Summary – June 2012				
Operating Time:		Percent Uptime:		Electrical Power Usage:
<b>NGWTP:</b>	7 hours <sup>a</sup>	<b>NGWTP:</b>	1.0%	<b>NGWTP:</b> 457 kWh (626 lbs CO <sub>2</sub> generated <sup>b</sup> )
Gallons Treated: <b>560 gallons<sup>c</sup></b>		Gallons Treated Since March 2000: <b>82.7 million gallons</b>		
Volume Discharged to Duck Pond <b>0 gallons</b>		Volume Discharge to Storm Drain: <b>0 gallons</b>		
VOC Mass Removed: <b>7.4 x 10<sup>-6</sup> pounds<sup>d</sup></b>		VOC Mass Removed Since March 2000: <b>174.3 pounds (Groundwater)</b>		
Rolling 12-Month Cost per Pound of Mass Removed: <b>Not Measured<sup>e</sup></b>				
Monthly Cost per Pound of Mass Removed: <b>Not Measured<sup>e</sup></b>				
<sup>a</sup> The NGWTP remains offline since the system shutdown on 21 March 2012. It was briefly operated for groundwater sampling and 6 June 2012.				
<sup>b</sup> Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG. Energy usage reported from the last month of operation in March 2012.				
<sup>c</sup> All water treated on 6 June 2012 is being stored in holding tanks pending the results of the sampling event.				
<sup>d</sup> VOCs from June 2012 influent sample detected by EPA Method SW8260B.				
<sup>e</sup> Value not calculated since measurement does not accurately represent the cost effectiveness of the system based on the June operations.				

Table 2 presents average a summary of shutdowns during the monthly reporting period.

Table 2 – Summary of System Shutdowns					
Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
NGWTP	21 March 2012	14:30	6 June 2012	09:30	Seasonal vernal pools at Site LF007C contain ponded water. System will resume operation when the vernal pools are dry.
NGWTP	6 June 2012	15:00	TBD		Monthly groundwater samples were taken and the system was shutdown pending sample results and GAC vessel repair.
NGWTP = North Groundwater Treatment Plant					

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## Summary of O&M Activities

Analytical data from the 6 June 2012 sampling event are presented in Table 3. A concentration of TCE (1.8 µg/L) was detected in the influent sample. Prior to the 21 March 2012 shutdown of the NGWTP, TCE had been detected in the influent sample for seven (7) consecutive months. The contaminant concentration detected in the influent process stream is less than its respective effluent limit (5.0 µg/L). Contaminant concentrations were not detected between the primary and secondary vessels or at the effluent sampling location.

Figure 1 presents a chart of influent concentrations (total VOCs) at the NGWTP versus time for the past twelve (12) months. As required by US Fish and Wildlife Service (USFWS), the NGWTP was taken off line (“System Shutdown”) on 21 March 2012 when vernal pools had formed at Site LF007C. The NGWTP was briefly brought online, after the vernal pools had dissipated, on 6 June 2012 for startup treatment plant sampling. After system sampling, the North Plant was shut down to wait for the sample results. All of the water treated during startup sampling will be reprocessed through the treatment system prior to discharge to the duck pond. Upon verification that the system will be in compliance with discharge limits, the NGWTP will resume operation (expected to be in July 2012).

Analytical data (Table 3) continue to indicate effective treatment of the influent process stream with only two (2) operating GAC drums online. A spare GAC drum is available if analytical data indicate a third GAC drum should be brought back on line.

## Optimization Activities

No optimization activities occurred in June 2012.

## Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as the solar arrays employed to power the system.

Figure 2 presents the historical GHG production from the systems associated with the NGWTP. The NGWTP is off line (“System Shutdown”) when vernal pools are present at Site LF007C. The overall GHG generation remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays and this trend is expected to continue once groundwater remediation operations have been resumed.



TABLE 3  
Summary of Groundwater Analytical Data for June 2012 – North Groundwater Treatment Plant

6 June 2012						
Constituent	Instantaneous Maximum* (µg/L)	Detection Limit (µg/L)	N/C	(µg/L)		
				Influent	After Carbon 1	Effluent
Halogenated Volatile Organics						
Bromodichloromethane	5.0	0.15	0	ND	ND	ND
Bromoform	5.0	0.19	0	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND
1,1-Dichloroethane	5.0	0.5	0	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND
Trichloroethene	5.0	0.19	0	1.8	ND	ND
Vinyl Chloride	0.5	0.18	0	ND	ND	ND
Non-Halogenated Volatile Organics						
Benzene	1.0	0.17	0	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND	ND
Other						
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	NM	ND
Total Dissolved Solids (mg/L)	NA	10	0	NM	NM	2,120

\* In accordance with Appendix G of the *Travis AFB North Groundwater Treatment Plant Operations and Maintenance Manual*, Sites FT004, SD031, and LF007 Area C (URS Group, Inc., 2005).

Notes:

N/C = number of samples out of compliance with discharge limits

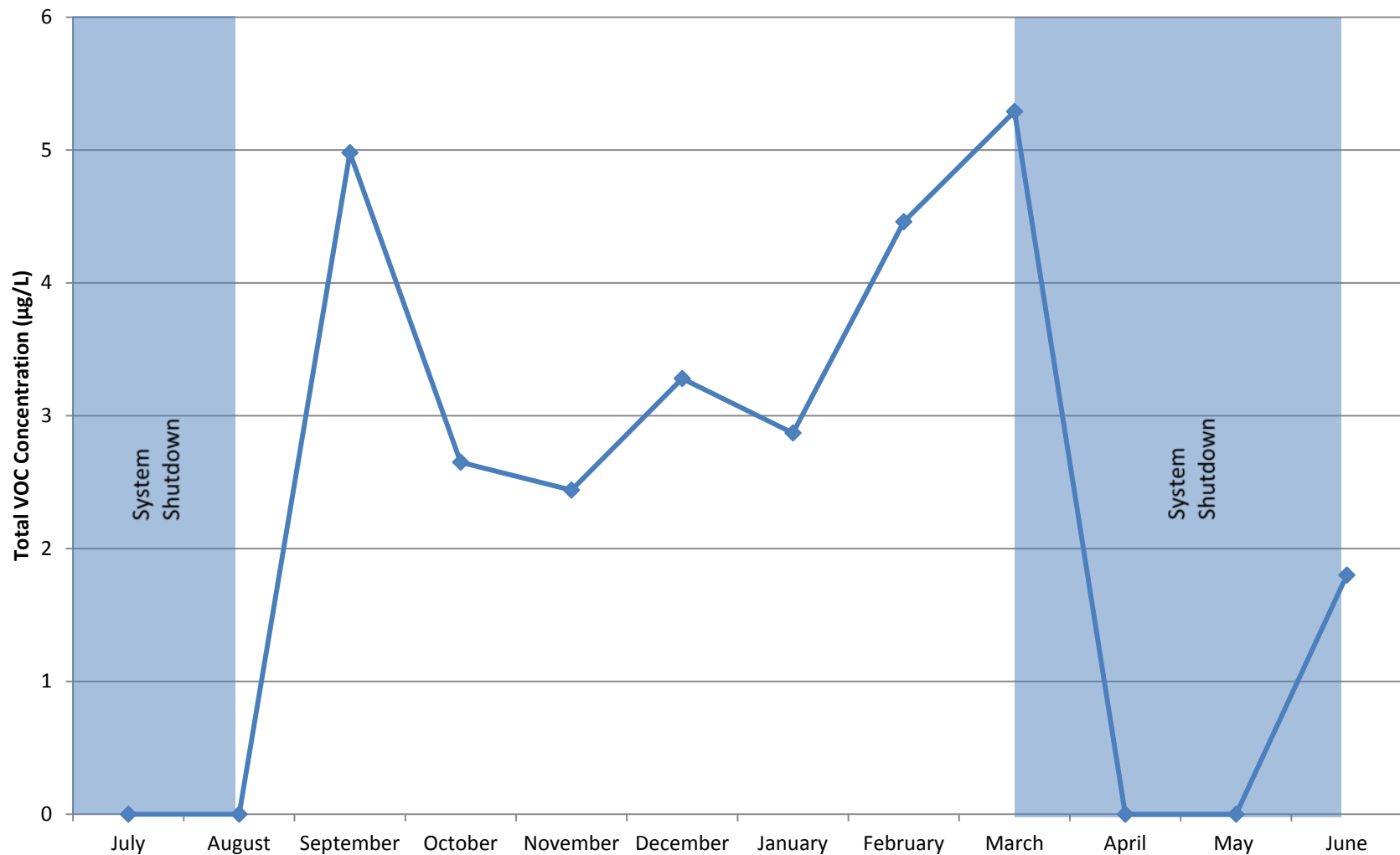
ND = not detected

NM = not measured

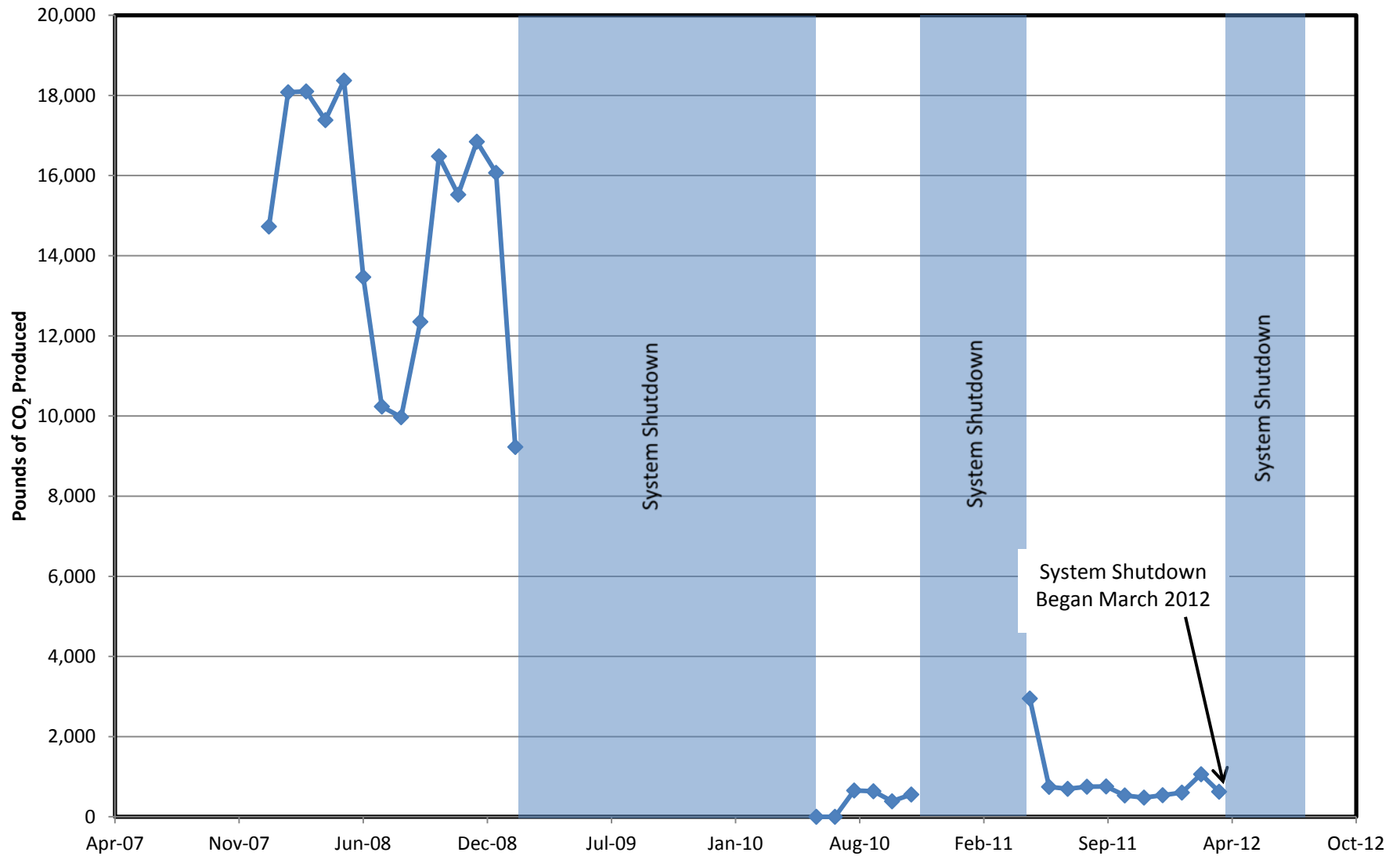
µg/L = micrograms per liter

mg/L = milligrams per liter

**Figure 1**  
**NGWTP Total VOC Influent Concentrations - Twelve Month History**  
**Travis Air Force Base, California**



**Figure 2**  
**Equivalent Pounds of CO<sub>2</sub> Produced by the North Groundwater Treatment Plant**



# Site ST018 Groundwater Treatment Plant Monthly Data Sheet

Report Number: 016

Reporting Period: 31 May 2012 – 30 June 2012

Date Submitted: 12 July 2012

This monthly data sheet presents information regarding the Site ST018 Groundwater Treatment Plant (S18GWTP).

## System Metrics

Table 1 presents operation data from the June 2012 reporting period.

Table 1 – Operations Summary – June 2012			
Operating Time:		Percent Uptime:	Electrical Power Usage:
<b>S18GWTP:</b>	608 hours	<b>S18GWTP:</b> 91%	<b>S18GWTP:</b> 178 kWh (244 lbs CO <sub>2</sub> generated <sup>a</sup> )
Gallons Treated: <b>191 thousand gallons</b>		Gallons Treated Since March 2011: <b>2.32 million gallons</b>	
Volume Discharged to Union Creek: <b>191 thousand gallons</b>			
BTEX, MTBE, TPH Mass Removed: <b>2.63 lbs<sup>b</sup></b>		BTEX, MTBE, TPH Mass Removed Since March 2011: <b>17.3 lbs</b>	
Rolling 12-Month Cost per Total Pounds of Mass Removed: \$6,710 <sup>c</sup>			
Monthly Cost per Pound of Mass Removed: \$2,132			
Lbs = pounds			
<sup>a</sup> Based on Department of Energy estimate that 1 kilowatt hour generated produces 1.37 pounds of GHG.			
<sup>b</sup> Calculated using April 2012 (influent) and June 2012 (effluent) EPA Method SW8260B analytical results. Influent samples are collected on a quarterly basis.			
<sup>c</sup> Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.			

Table 2 presents individual extraction well flow rates along with the average system flow during the monthly reporting period.

Table 2 – S18GWTP Average Flow Rates <sup>a</sup>	
Location	Average Flow Rate Groundwater (gpm)
EW2014x18	1.45
EW2016x18	1.43
EW2019x18	1.74
Site ST018 GWTP	4.73
<sup>a</sup> All flow rates calculated by dividing total gallons processed by system operating time for the month. gpm = gallons per minute S18GWTP = Site ST018 Groundwater Treatment Plant	

Table 3 presents a summary of system shutdowns during the monthly reporting period.

Table 3 – Summary of System Shutdowns					
Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
	6/2/2012	00:00 <sup>a</sup>	6/4/2012	15:00	System shutdown over the weekend as a result of high back pressure caused by fine silt in piping and first GAC vessel. Piping and check valve was cleaned and the system restarted.
<sup>a</sup> System shutdown time estimated as 12:00 am for weekend shutdown. S18GWTP = Site ST018 Groundwater Treatment Plant					

## Summary of O&M Activities

Groundwater samples were collected at the S18GWTP on 7 June 2012. Sample results from the June sampling event are presented in Table 4. The analytical results show that no contaminant concentrations were measured at the midpoint and effluent sampling locations in June 2012.

The total influent concentration (benzene, toluene, ethylbenzene, total xylenes, MTBE, TPH-gas, TPH-diesel, and TPH-motor oil) in the quarterly (2Q12) influent sample was 1,658 µg/L, which is a significant increase from the previous (1Q12) influent concentration of 455 µg/L. This increase is likely due to more consistent operation of extraction well EW2014x18, located immediately behind the Base Exchange Service Station. The Site ST018 GWTP was primarily installed to address MTBE contamination at Site ST018, so Figure 1 presents a plot of influent quarterly total VOC (TPHg, TPHd, MTBE, and BTEX) and MTBE concentrations at the S18GWTP versus time.

In January 2012, sample results from the annual S18GWTP sampling event identified trigger compound exceedances for copper, zinc, cadmium, and nickel. As required by the Site ST018 NPDES permit, the sampling frequency of copper and zinc will be increased to a quarterly schedule since at least one (1) of the three (3) additional discharge samples (March 2012) also showed exceedance of the two trigger compounds. Quarterly sampling of copper and zinc will begin with the July 2012 sampling event, be reported annually in the Annual Self-Monitoring Reports, and continue until the Water Board determines that the triggered pollutants investigation is complete. Full details regarding this trigger study, along with all other sample results will be presented in the next annual S18GWTP report.

Another trigger study began in June 2012 in response to the trigger exceedance of TPH-mo in the system effluent during the May 2012 sampling event. The results are presented in Table 5. Results from the first trigger study sampling event in June 2012 indicated that TPH-mo was not detected in the system influent or effluent. The TPH-mo trigger study sampling will continue for two (2) more months, until August 2012.

A system shutdown occurred this month due to high back pressure caused by silting in the primary carbon vessel. This silting problem likely originates at extraction well EW2014x18. The piping and check valve at the primary GAC vessel have been cleaned and the plant restarted. However, if silting continues to occur, redevelopment of this well will be considered to alleviate the siltation.

## Optimization Activities

No optimization activities were performed in June 2012.

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## Sustainability

Travis AFB is committed to decreasing the amount of GHG produced directly (waste streams discharging GHG) or indirectly (GHG produced as related to electrical energy consumption) from all systems across Travis AFB. Travis AFB continues to optimize each treatment plant to reduce the amount of electrical energy consumed, and to implement sustainable treatment plant optimization programs, such as the solar arrays employed to power the system.

As a result of the solar arrays at S18GWTP, the system produced only approximately 244 pounds of GHG during June 2012. This is a minimal increase from May 2012 (242 pounds). Figure 2 presents the historical GHG production from the S18GWTP. The overall GHG generation remains considerably lower than traditional GWTPs since the system is predominantly powered by solar arrays.

TABLE 4  
Summary of Groundwater Analytical Data for June 2012 – Site ST018 Groundwater Treatment Plant

Constituent	Instantaneous Maximum <sup>a</sup> (µg/L)	Detection Limit (µg/L)	N/C	7 June 2012 (µg/L)		
				Influent <sup>b</sup>	After Carbon 2	System Effluent
Fuel Related Constituents						
MTBE	5	0.5	0	156	ND	ND
Benzene	5	0.17	0	20.6	ND	ND
Ethylbenzene	5	0.22	0	37.3	ND	ND
Toluene	5	0.14	0	2.6	ND	ND
Total Xylenes	5	0.23 – 0.5	0	61.1	ND	ND
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	1100	ND	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	280	ND	ND
Total Petroleum Hydrocarbons – Motor Oil	--	160	--	ND	ND	ND

<sup>a</sup> In accordance with the National Pollutant Discharge Elimination System (NPDES) Effluent Limitations

<sup>b</sup> Values taken from April 2012 (2Q12) sample data. Influent sampling is conducted on a quarterly basis.

Notes:

µg/L = micrograms per liter

ND = not detected above method detection limit

NM = not measured this month

Table 5  
Summary of Quarterly Trigger Study Analytical Data From June 2012 – Site ST018 Groundwater Treatment Plant

Constituent	Trigger Limit <sup>a</sup> (µg/L)	7 June 2012 (µg/L)	
		Influent	Effluent
Total Petroleum Hydrocarbons – Motor Oil	50	ND	ND

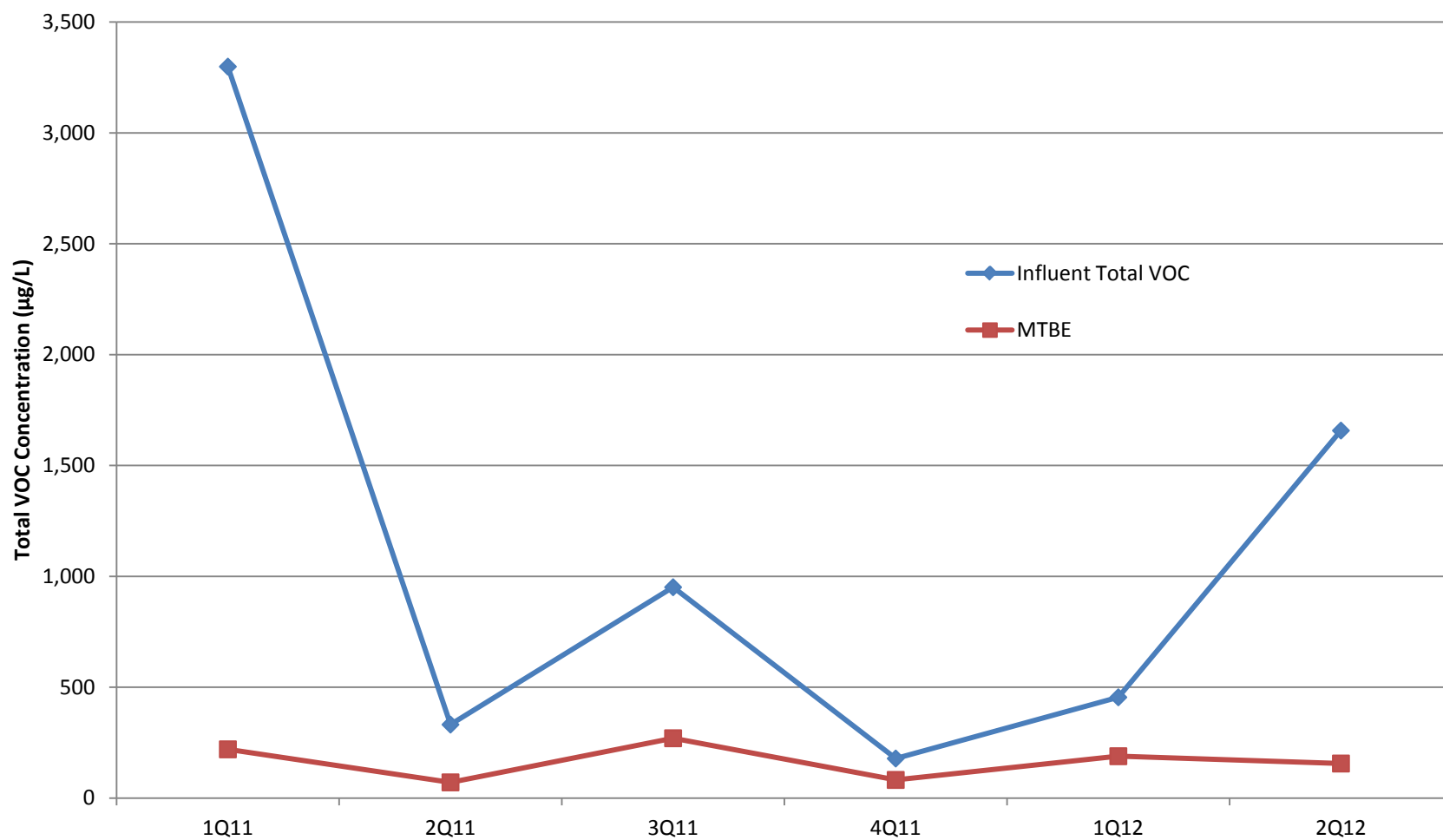
<sup>a</sup> In accordance with the National Pollutant Discharge Elimination System (NPDES) Effluent Limitations

Notes:

µg/L = micrograms per liter

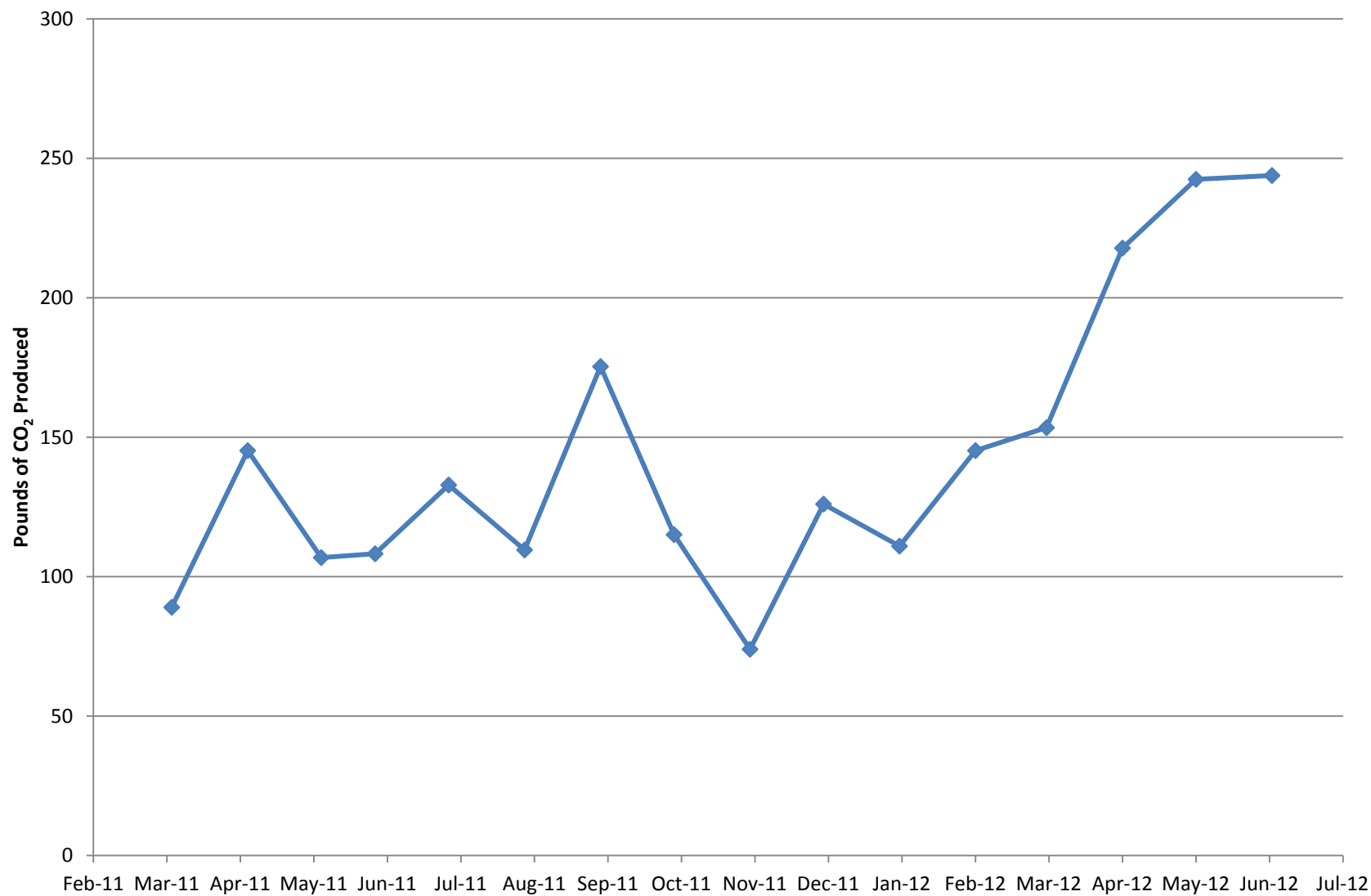
ND = not detected above method detection limit

**Figure 1**  
**S18GWTP Total VOC and MTBE Influent Concentrations**  
**(Benzene, Toluene, Ethylbenzene, Xylenes, MTBE, TPH)**  
**Travis Air Force Base, California**





**Figure 2**  
**Equivalent Pounds of CO<sub>2</sub> Produced by the Site ST018 Groundwater Treatment Plant**



# LF007 CAMU Lysimeter Removal

## June 2012

# Background of LF007 CAMU

- The LF007 Corrective Action Management Unit (CAMU) was constructed in December 2002 on top of LF007 (a former municipal landfill) and capped with an engineered evapotranspiration (ET) final cover system.
- In 2003, a lysimeter was installed, intended for a 1 year monitoring duration, to verify that the ET cover performed as designed. Since installation, monitoring was conducted monthly. Monitoring results collected since 2008 had produced increasingly contradictory data due to normal wear and tear of the equipment.
- With regulatory agency approval, lysimeter monitoring ceased in May 2010 and the lysimeter was scheduled for removal.

# LF007 Lysimeter Removal

- LF007 Lysimeter removal activities were conducted June 18 through June 21, 2012.
- Intermediate and cover soil removed from the lysimeter was reused in the excavation after completion of demolition. Approximately 18 cubic yards of pre-sampled Potrero Hills Quarry borrow soil was needed to supplement the reused soil during backfill and compaction activities.
- Concrete (approximately ½ ton) was recycled for reuse on the Travis AFB runway project and one poly tank was repurposed.
- Plastic liners and two poly tanks (containing grout) were disposed of at a local municipal landfill (Solano Garbage Company).

# LF007 Lysimeter prior to demolition



# Clearing and Grubbing





# Exposure of the Geomembrane



# Exposed Geomembrane





# Removal of Geomembrane



# Exposure of soil beneath the Geomembrane





# Exposed soil prior to backfill



# Backfill activities





# Compaction of backfilled soil



# Compaction testing





# Final grading and completion of demolition activities



# Enzyme Cometabolism Study Results From Sites FT004 and DP039 Travis AFB

RPM Meeting  
July 18, 2012

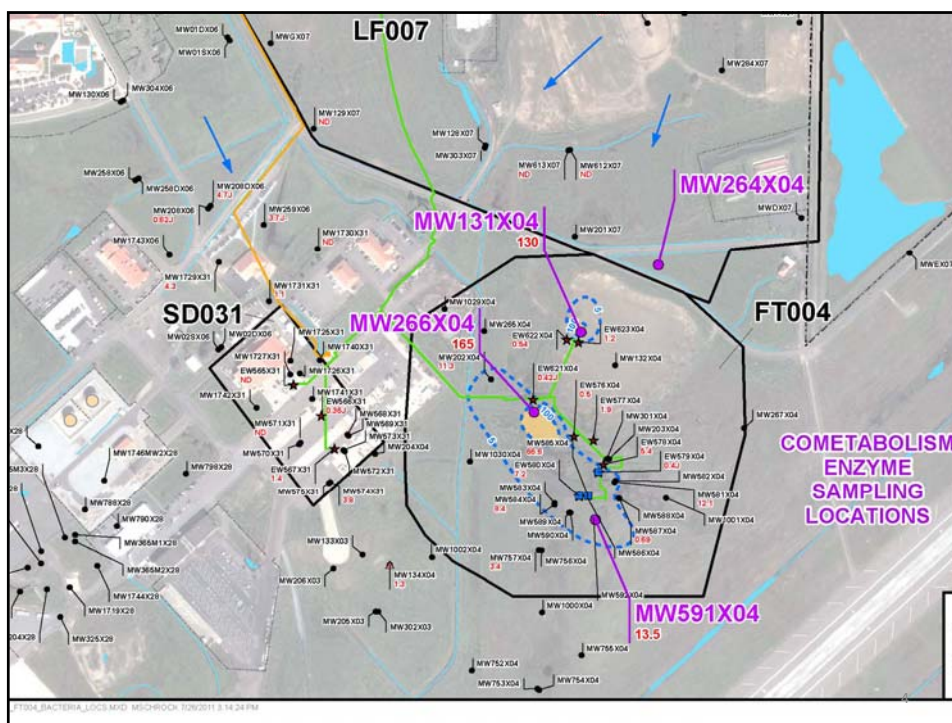
## Goal of the Enzyme Study

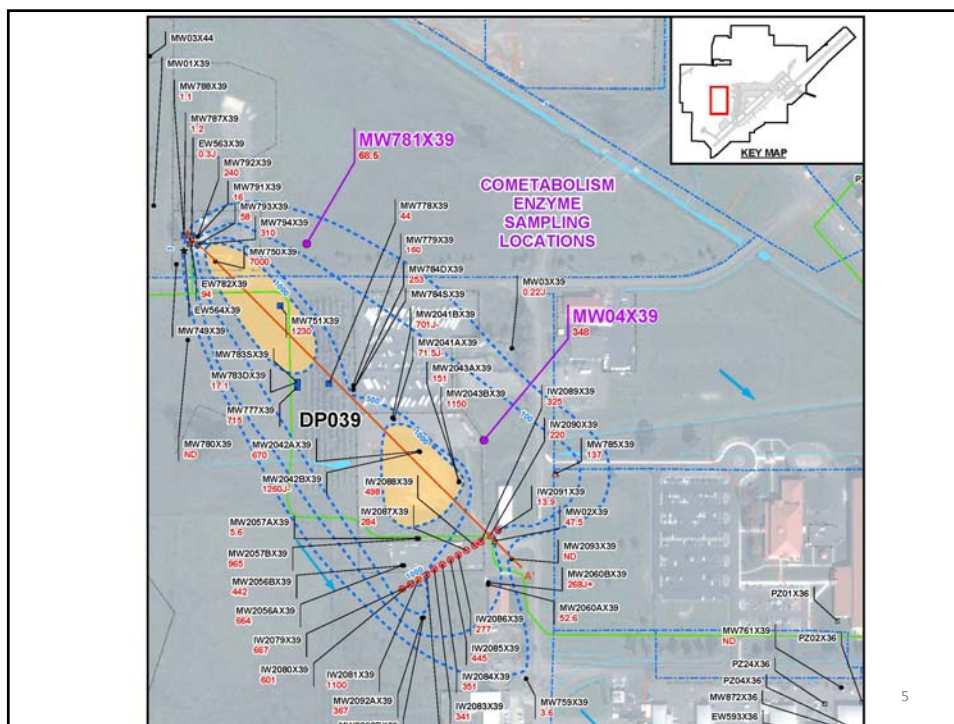
The goal of this study is to determine if, through analysis of enzyme cometabolism, there is a biological component to the observed natural attenuation of VOC plumes at Travis AFB



## Sample Locations

- Sites FT004 and DP039 were selected for the Enzyme Cometabolism Evaluation because:
  - Both sites have MNA components
  - The two sites are located on opposite sides of Travis AFB
  - The areas to be sampled have low to non-detect concentrations of DCE and vinyl chloride.
- Site FT004 was also selected because TCE concentrations have been decreasing with the GET system off as part of a rebound study since December 2007
- Four monitoring wells from Site FT004 were sampled for VOCs, enzyme activity probes (EAPs), and quantitative polymerase chain reaction (qPCR) analyses
  - One of the wells sampled is located upgradient of the VOC plume and represents “background”
- Two monitoring wells from Site DP039 were sampled for VOCs, EAPs, and qPCR
  - A duplicate sample was collected from one of the DP039 wells for QA/QC





## Enzyme Activity Probe Analyses

- This EAP study was performed to evaluate the presence and activity of five enzymes that cometabolically degrade TCE:
  - Toluene-2-monooxygenase (T2-mono)
  - Toluene-3-monooxygenase (T3-mono)
  - Toluene-2,3-dioxygenase (T23-di)
  - Soluble methane monooxygenase (sMMO)
  - Particulate methane monooxygenase (pMMO)
- The groundwater samples were each analyzed using the following five EAPs:
  - 3-hydroxyphenylacetylene (3hpa) for T2-mono, T3-mono, and T23-di
  - Phenylacetylene (PA) for T23-di, T3-mono, and T2-mono
  - Trans-cinnamionitrile (CINN) for T23-di
  - Coumarin for sMMO
  - Naphthalene for sMMO

## Quantitative Polymerase Chain Reaction Analyses

- To confirm the presence of the enzymes identified during the EAP analyses, qPCR analyses were conducted for each groundwater sample
- qPCR identifies the presence of the enzyme genes or the bacteria being evaluated as part of the EAP analyses
- Eight qPCRs were conducted on the groundwater samples:
  - PHE for T2-mono, T3-mono, and Toluene-4-monooxygenase (T4-mono)
  - RMO for T3-mono and T4-mono
  - TOD for T23-di
  - RDEG for T3-mono and T4 mono
  - mmoX for sMMO
  - pmoA for pMMO
  - alkB for Alkane monooxygenase
  - CAT for Catechol-2,3-dioxygenase.

7

## VOC Results

TABLE 2  
VOC Analytical Results  
Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes, Travis Air Force Base, California

Well	Well Position	Depth (feet)	Date	TCE (µg/L)	DCE* (µg/L)	Vinyl Chloride (µg/L)
<b>Site FT004</b>						
MW131x04	Plume	10–30	2/21/2012	154	3.4	ND
MW264x04	Background	15–25	2/21/2012	ND	ND	ND
MW266x04	Plume	6–16	2/21/2012	122	3.4	ND
MW591x04	Distal	15–35	2/21/2012	19.7	1.82	ND
<b>Site DP039</b>						
MW04x39	Plume	16–26	2/21/2012	447	10.1	ND
MW781x39	Plume	27–37	2/21/2012	53.5	0.52 J	ND
			2/21/2012 (Dup)	49.9	0.58 J	ND

\* Total concentration of cis-, trans-, and 1,1-DCE isomers

Notes:

µg/L = microgram(s) per liter

DCE = dichloroethene

J = estimated concentration

ND = not detected

TCE = trichloroethene

8

## VOC Results (Continued)

- TCE concentrations at the monitoring wells are similar to previous sampling events.
- Low to non-detect concentrations of DCE and vinyl chloride.
- Background well MW264x04 is non-detect for chlorinated VOCs.

9

## EAP Results

TABLE 4  
Enzyme Activity Probe Results  
Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes, Travis Air Force Base, California

Well	Well Position	DAPI (cells/mL) Total	3-HPA (cells/mL) T3-mono	PA (cells/mL) T2-mono	CINN (cells/mL) TOD	Coumarin (cells/mL) sMMO	Naphthalene (cells/mL) sMMO and pMMO
MW131x04	Plume	4.52E+04	<b>1.17E+04</b>	<b>3.55E+04</b>	<b>4.17E+04</b>	Neg	Neg
MW264x04	Background	7.64E+04	0.00E+0	0.00E+0	0.00E+00	Neg	Neg
MW266x04	Plume	3.67E+05	<b>1.01E+04</b>	5.48E+03	0.00E+00	Neg	Neg
MW591x04	Distal	2.23E+04	<b>1.62E+04</b>	<b>1.54E+04</b>	<b>1.68E+04</b>	Neg	Neg
MW04x39	Plume	1.11E+05	<b>1.87E+04</b>	<b>1.78E+04</b>	0.00E+00	Neg	Neg
MW781x39	Plume	8.65E+04	<b>1.59E+04</b>	0.00E+00	0.00E+00	Neg	Neg
MW781x39 (Dup)	Plume	5.74E+04	<b>1.48E+04</b>	<b>9.89E+03</b>	5.48E+03	Neg	Neg
MW7B	Tripblank	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Neg	Neg

Notes:

Significant values are **bolded** ( $\geq 8.0 \times 10^3$  cells/mL)

3-HPA = 3-hydroxyphenylacetyl

cells/mL = cell(s) per milliliter

CINN = trans-cinnamitrile

DAPI = 4',6'-diamidino-2-phenylindole

PA = phenylacetylene

pMMO = particulate methane monooxygenase

sMMO = soluble methane monooxygenase

T2-mono = toluene-2-monooxygenase

T3-mono = toluene-3-monooxygenase

TOD = toluene-2,3-dioxygenase

10

## qPCR Results

**TABLE 5**  
Quantitative PCR Results  
Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes, Travis Air Force Base, California

Well	Well Position	PHE	RMO	TOD	23CAT	sMMO	pMMO	alkB
MW131x04	Plume	+	740	<b>1,701</b>	<b>6,100</b>	ND	ND	ND
MW264x04	Background	ND	ND	ND	ND	ND	ND	ND
MW266x04	Plume	+	<b>3,340</b>	ND	<b>405,000</b>	ND	ND	ND
MW591x04	Distal	+	<b>4,020</b>	ND	<b>37,500</b>	ND	ND	ND
MW04x39	Plume	+	<b>5,840</b>	ND	<b>43,600</b>	ND	ND	ND
MW781x39	Plume	+	<b>8,440</b>	ND	<b>6,350</b>	ND	ND	ND
MW781x39 (Dup)	Plume	+	<b>8,440</b>	ND	<b>19,400</b>	ND	ND	ND
MW7B	Tripblank	ND	ND	ND	ND	ND	ND	ND

**Notes:**

Because of high background noise, the PHE results are shown as positive or negative rather than as numerical results. Positive results are **bolded**.

Numerical results reported in the gene copy numbers. Significant number of gene copies are **bolded** ( $\geq 1,000$  gene copies).

23CAT = catechol-2,3-dioxygenase

alkB = alkane monooxygenase

ND = no product detected within range of standard curve

PHE = toluene-2,3,4-monooxygenase

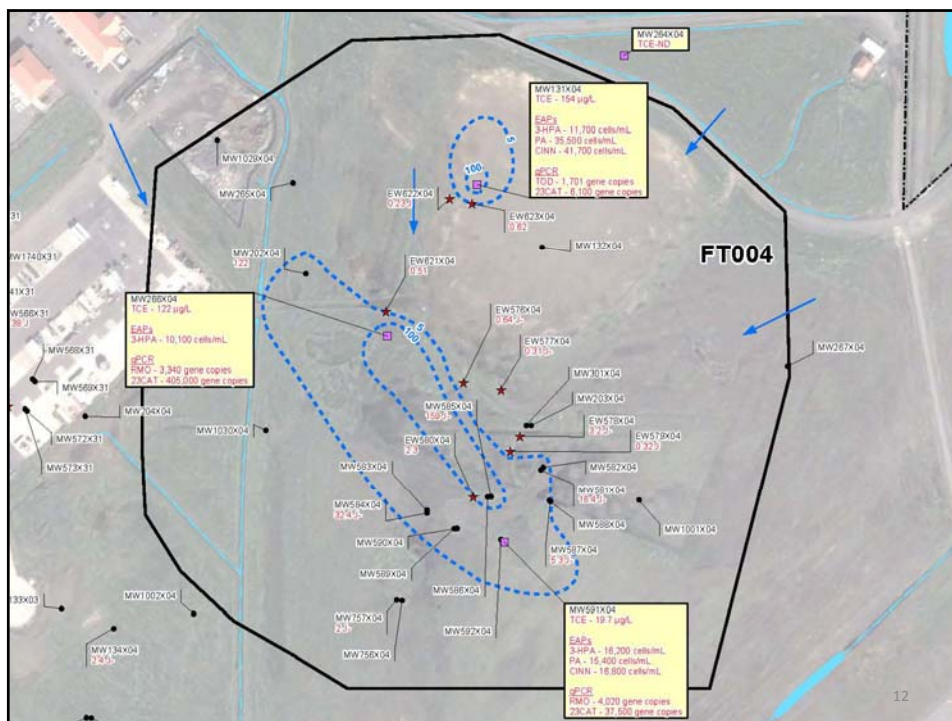
pMMO = particulate methane monooxygenase

RMO = toluene-3,4-monooxygenase

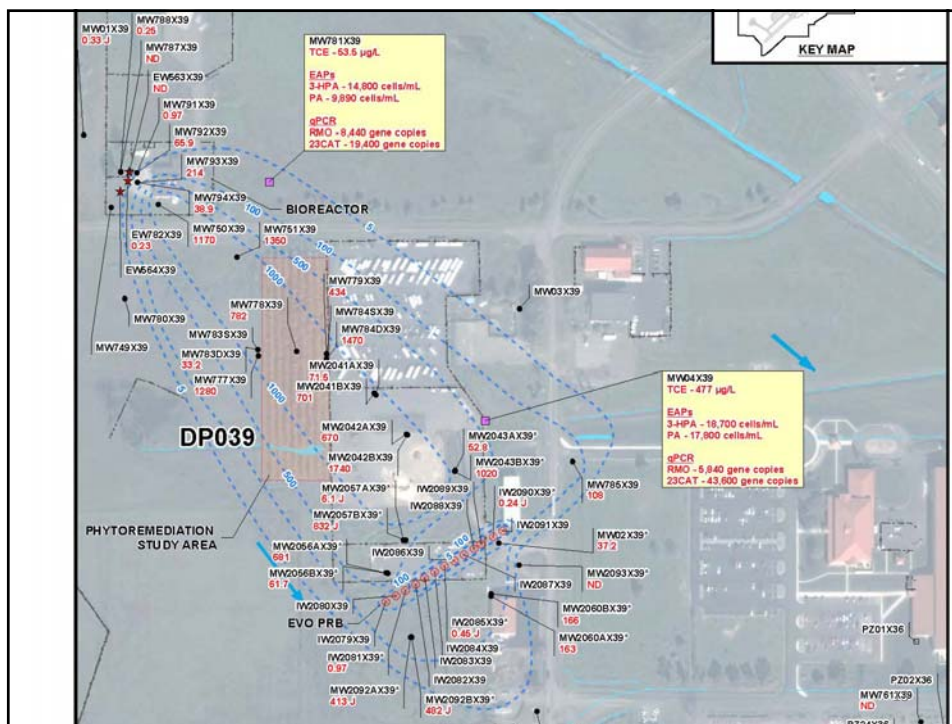
sMMO = soluble methane monooxygenase

TOD = toluene-2,3-dioxygenase

11







## Plume Attenuation

- For MNA to be considered a viable remedy, it is necessary to demonstrate plume attenuation (i.e., stable and/or shrinking)
- A limitation of the EAP and qPCR data:
  - demonstration of the activity of cometabolic enzymes cannot fully show the degree to which cometabolism contributes to the natural attenuation of a solvent plume
- However, if contaminant concentrations are decreasing over time and cometabolic enzymes and microbes are present and active, then it can be inferred that microbial processes may be contributing to the reduction of contaminant mass
- Sites FT004 and DP039 have been evaluated for over a decade and monitoring data indicate that plume attenuation is occurring at both sites.

## Conclusions

- At least one EAP showed significant activity in groundwater samples collected from each of the plume monitoring wells at both of the sites studied
- qPCR data supports the EAP results. Positive amplifiable gene targets correspond well with EAP results (which showed significant enzyme activity)
- The EAP and qPCR results indicate the presence and activity of toluene enzymes but not methane enzymes – Indicates methane is not a primary substrate, and that humics (degraded organic matter) are the likely substrate for bacteria
- The EAP and qPCR results provide evidence of potential for intrinsic aerobic biodegradation at Sites FT004 and DP039

15

## Conclusions (Continued)

- The results of the investigation are indicative of enzymatic cometabolic activity at similar but geographically distant indicator groundwater sites (FT004 and DP039) and provide one line of evidence supporting the occurrence of biological natural attenuation at Travis AFB
- Due to the similar hydrogeologic conditions across Travis AFB, it is likely that cometabolic enzymes are widespread at the Base, and that cometabolic activity may be contributing to natural attenuation not only at Sites FT004 and DP039, but also at the other VOC plumes.

16

# Third 5-Year Review Report Site Inclusion List and Report Schedule

Travis AFB

RPM Meeting

July 18, 2012



# Third 5-Year Review Report

## Site Inclusion Matrix

Site Name	Site Description	Status of Environmental Response Activities	Second 5-year Review	Third 5-year Review	Basis for Inclusion
<b>SD001</b>	Union Creek - NEWIOU	Sediment remedial action and site closure achieved in 2010.	<b>Yes</b>	<b>Yes</b>	Soil, Sediment, Surface Water ROD; Site Closure After Second 5 Year Review.
<b>FT003</b>	Fire Training Area 2 - NEWIOU	Soil remedial action and site closure achieved in 2007.	<b>Yes</b>	<b>Yes</b>	Soil, Sediment, Surface Water ROD; Site Closure After Second 5 Year Review.
<b>FT004</b>	Fire Training Area 3 - NEWIOU Soil and GW Site	TPH Contaminated Soil. GET in Rebound Evaluation.	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD; NEWIOU Soil, Sediment, and Surface Water ROD.
<b>FT005</b>	Fire Training Area 4 - NEWIOU Soil and GW Site	GET. Soil remediation is ongoing.	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD; NEWIOU Soil, Sediment, and Surface Water ROD.
<b>LF006</b>	Landfill 1 - NEWIOU GW Site	MNA	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD

# Third 5-Year Review Report

## Site Inclusion Matrix

Site Name	Site Description	Status of Environmental Response Activities	Second 5-year Review	Third 5-year Review	Basis for Inclusion
<b>LF007</b>	Landfill 2 - NEWIOU Soil and GW Site	Groundwater treated via on-base migration control and off-base remediation via GET. Soil contamination through excavation and LUCs.	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD; NEWIOU Soil, Sediment, and Surface Water ROD.
<b>LF008</b>	Landfill 3 - WABOU Pesticide GW Site	Soil Remediated to Residential Levels. GET in Rebound Evaluation.	<b>Yes</b>	<b>Yes</b>	WABOU Soil ROD and GW IROD.
<b>SS014</b>	POCO	Remedy In Place; MNA.	<b>Yes</b>	<b>Yes</b>	Active Monitoring
<b>SS015</b>	Solvent Spillage Area - NEWIOU Soil and GW Site	In-Situ EVO Injection Demonstration Project Ongoing. LUCs for Soil.	<b>Yes</b>	<b>Yes</b>	Soil, Sediment, Surface Water ROD and NEWIOU GW IROD.
<b>SS016</b>	Oil Spill Area- NEWIOU Soil and GW Site	GET and In-Situ Remediation of Source Zone.	<b>Yes</b>	<b>Yes</b>	Soil, Sediment, Surface Water ROD and NEWIOU GW IROD.

# Third 5-Year Review Report

## Site Inclusion Matrix

Site Name	Site Description	Status of Environmental Response Activities	Second 5-year Review	Third 5-year Review	Basis for Inclusion
<b>ST027</b>	ST-33 Test Area-POCO and CERCLA GW Site	Petroleum and TCE (ST027-Area B) in groundwater.	<b>Yes</b>	<b>Yes</b>	Not Comingled - divided into two parts. Part A is POCO - Part B is CERCLA.
<b>SS029</b>	MW329x29 Area-NEWIOU GW Site	GET	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD
<b>SS030</b>	Former MW269 Area - NEWIOU GW Site	GET	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD
<b>SD031</b>	Building 1205 Maintenance Facility - NEWIOU GW Site	GET in Rebound Evaluation.	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD
<b>ST032</b>	POCO Site. MW246. NEWIOU Soil and GW Site	GET (included in SS029) and LUC for Soil.	<b>Yes</b>	<b>Yes</b>	NEWIOU Soil, Sediment, and Surface Water ROD and GW IROD.

# Third 5-Year Review Report

## Site Inclusion Matrix

Site Name	Site Description	Status of Environmental Response Activities	Second 5-year Review	Third 5-year Review	Basis for Inclusion
<b>SD033</b>	WIOU Storm Sewer System-NEWIOU GW Site	Sediment Remediated. GET operations. GW Site.	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD and Soil, Sediment, and Surface Water ROD.
<b>SD034</b>	Facility 811-NEWIOU Soil and GW Site	No Action for Soil; SPH-Stoddard Solvent, GET operations.	<b>Yes</b>	<b>Yes</b>	Groundwater IROD for NEWIOU
<b>SS035</b>	Facility 818-819-NEWIOU Soil and GW Site	GET	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD
<b>SD036</b>	Facility 872, 873, 876-NEWIOU Soil and GW Site	GET is on hold while in-situ bioremediation is ongoing.	<b>Yes</b>	<b>Yes</b>	NEWIOU GW IROD
<b>SD037</b>	Sanitary Sewer along Ragsdale Street, NEWIOU Soil and GW Site	GET is on hold while in-situ bioremediation is ongoing.	<b>Yes</b>	<b>Yes</b>	NEWIOU Soil, Sediment, and Surface Water ROD and GW IROD.

# Third 5-Year Review Report

## Site Inclusion Matrix

Site Name	Site Description	Status of Environmental Response Activities	Second 5-year Review	Third 5-year Review	Basis for Inclusion
<b>DP039</b>	Battery and Electrical Shop Neutralization Pit-WABOU Soil and GW Site	Sump source area removed. LUC for Soil. Bio-reactor installed in the source area. GET on hold while Site subject to numerous demonstration projects.	<b>Yes</b>	<b>Yes</b>	WABOU GW IROD
<b>SS041</b>	Building 905 - WABOU Soil and GW Site	The soil was remediated in 2003 to residential levels and the groundwater is currently in a no further remedial action planned status.	<b>Yes</b>	<b>Yes</b>	WABOU Soil ROD and GW IROD.
<b>SD043</b>	Drainage Ditch Emergency Generator Plant Sump-WABOU Soil and GW Site	LUCs for soil and GET.	<b>Yes</b>	<b>Yes</b>	WABOU Soil ROD and GW IROD.

# Third 5-Year Review Report

## Site Inclusion Matrix

Site Name	Site Description	Status of Environmental Response Activities	Second 5-year Review	Third 5-year Review	Basis for Inclusion
<b>LF044</b>	Former Disposal Area Construction Debris-WABOU Soil Site	LUCs are in effect.	<b>Yes</b>	<b>Yes</b>	WABOU Soil ROD
<b>SS046</b>	Railhead Munitions Staging Area - WABOU Soil Site	LUCs are in effect.	<b>Yes</b>	<b>Yes</b>	WABOU Soil ROD

# Third 5-Year Review Report Schedule

Life Cycle	Third 5-Year Review Report
Pre-Draft to AF	02-18-13
Draft to Agencies	03-18-13
Draft to RAB	03-18-13
Agency Comments Due	04-15-13
Response to Comments Meeting	04-29-13
Response to Comments Due	05-13-13
<b>Draft Final Due</b>	<b>NA</b>
Final Due	06-10-13
<b>Public Comment Period</b>	<b>NA</b>
<b>Public Meeting</b>	<b>NA</b>

# Travis AFB Restoration Program

## Program Overview

*RPM Meeting*

*July 18, 2012*



# Completed Documents

- Basewide Health & Safety Plan (HSP)
- Action Plan
- 2007/2008 GSAP Annual Report
- LF007C RPO Work Plan
- LF008 Rebound Study Work Plan
- SS014 Tier 1 POCO Evaluation Work Plan
- ST027B Site Characterization Work Plan
- SS030 RPO Work Plan
- ST032 POCO Technical Memo
- DP039 Bioreactor Work Plan
- 2008 Annual GWTP RPO Report
- Passive Diffusion Bag (PDB) Technical Memo
- RD/RA QAPP Update
- ST032 Tier 1 POCO Evaluation Work Plan
- Phytostabilization Demonstration Technical Memo
- Model QAPP
- LF008 Rebound Test Technical Memo
- Comprehensive Site Evaluation Phase II Work Plan
- Field Sampling Plan (FSP)
- SS016 RPO Work Plan
- ST018 POCO RA Work Plan
- Vapor Intrusion Assessment Report
- GSAP 2008/2009 Annual Report
- FT005 Data Gap Work Plan
- First, Second, & Third Site DP039 Sustainable Bioreactor Demonstration Progress Reports
- DP039 RPO Work Plan
- SD036/SD037 RPO Work Plan
- ST027B Site Characterization Report
- 2009 GWTP RPO Annual Report
- Natural Attenuation Assessment Report (NAAR)
- Union Creek Sites SD001 & SD033 Remedial Action Report

# Completed Documents (cont'd)

- CAMU 2008-2009 Monitoring Annual Report
- Phytostabilization Study Report
- 2009/2010 Annual GSAP Report
- SS015 Remedy Optimization Field Implementation Plan
- Sites SS014 and ST032 Tier 1 POCO Evaluation Report
- SD036 Remedy Optimization Field Implementation Plan
- 2010 Annual CAMU Inspection Report
- Site ST018 POCO Baseline Implementation Report
- FT005 Data Gaps Investigation Report
- Comprehensive Site Evaluation Phase II Report
- 2010 Groundwater RPO Annual Report
- Focused Feasibility Study (FFS)
- Site ST027-Area B Human Health Risk Assessment
- Site ST027-Area B Ecological Risk Assessment
- Work Plan for Assessment of Aerobic Chlorinated Cometabolism Enzymes
- 2010/2011 Annual GSAP Report
- Baseline Implementation Report (Sites SS015, SS016, SD036, SD037, and DP039)
- 2011 CAMU Annual Report
- Technical and Economic Feasibility Analysis (TEFA)

# Completed Field Work

- ST027B Gore Sorber Survey–Phase 1
- ST027B Field Sampling – Phase 2
- GSAP 2008 Semi-annual Event
- ST027B Installation of Wells – Phase 3
- SS014 Site Characterization
- LF008 Rebound Study
- GSAP Annual Sampling Event - 2009
- SS030 Site Characterization–Phase 1
- ST027 Site Characterization -Phase 3
- ST014 Monitor Well Install - Subsite 3
- SD001/SD033 Sediment RA
- SS016 Site Characterization (OSA source area)
- ST018 Site Characterization
- SS030 Site Characterization (Off-base VOC Plume)
- DP039 Site Characterization (for Biobarrier Placement)
- SS014 & ST032 Q1 2010 MNA Sampling (2<sup>nd</sup> of 4 quarterly events)
- SD036 Additional Site Characterization (north & east)
- Therm/Ox System Removal
- SS016 Monitoring Well Installation
- SD037 EVO Injection Well Installation
- DP039 Monitoring Well & Injection Well Installation
- DP039 EVO Injection
- SD037 Monitoring Well Installation
- GSAP 2010 Annual Sampling Event
- SD037 EVO Injection
- SS015 Site Characterization
- South Plant GAC Change-out
- FT005 Data Gap Investigation
- SS016 Position Survey of EW03
- SS016 Bioreactor Installation
- SS016 Bioreactor Baseline Sampling
- DP039 Biobarrier Quarterly Performance Sampling

# Completed Field Work (cont'd)

- DP039 Bioreactor Quarterly Performance Sampling
- SD037 EVO Quarterly Performance Sampling
- SS015 EVO Baseline Sampling
- SD036 EVO Baseline Sampling
- SS016 Bioreactor Startup
- SD036 Injection Wells Installation
- SS015 Injection Wells Installation
- ST018 GETS Installation
- SD036 EVO Injection
- 2010 Semiannual GSAP
- SS015 EVO Injection
- Quarterly RPO Performance Monitoring (Feb 2011)
- ST018 GETS Startup
- Quarterly RPO Performance Monitoring (May 2011)
- 2011 Annual GSAP Sampling
- SS029 GET Shutdown Test (System Optimization analysis)
- Quarterly RPO Performance Monitoring (Aug 2011)
- Quarterly RPO Performance Monitoring (Nov 2011)
- 2011 Semiannual GSAP Sampling
- LF007C Site Characterization (Wetlands)
- FT005 Soil Remedial Action
- Performance Monitoring SS015 (4<sup>th</sup> Quarterly event)
- Sampling for Assessment of Aerobic Chlorinated Cometabolism Enzymes (Feb 21-22)
- 2012 Annual GSAP Sampling
- ***CAMU Lysimeter Removal***

# In-Progress Documents & Field Work

## Documents

- ***Technical Memorandum for Assessment of Aerobic Chlorinated Cometabolism Enzymes***
- Work Plan for RPO of Sites SS016 and SS029
- Old Skeet Range Engineering Evaluation/Cost Analysis
- 2011 Groundwater Treatment RPO Annual Report
- Proposed Plan (PP)
- Site LF007C Data Gaps Investigation Technical Memorandum

## Field Work

- ***SS029/SS016 System Optimization Analysis***

# Upcoming Documents

- FT005 Remedial Action Completion Report Jul
- Basewide Groundwater Record of Decision (ROD) Oct

# Upcoming Field Work

- LF007C GET System Optimization Summer 2012

*Note: Travis will try to notify regulatory agencies via email approximately one week in advance of planned field work*